PEPWAVE
Broadband Possibilities

MAX mobile router

User Manual

PepwaveMAX Series:
MAX 700 / HD2 /HD2 IP67 / BR1/ On-The-Go

Pepwave MAX Firmware 6.1
January 2014

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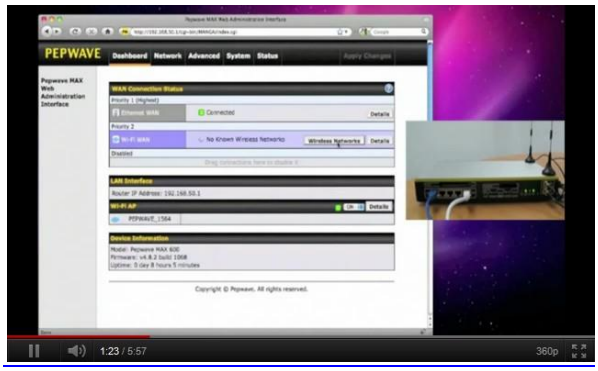
1 Introduction and Scope

The Pepwave MAX Mobile Router provides link aggregation and load balancing acrossmultiple WAN connections, allowing a combination of technologies like 3G HSDPA, EVDO, 4G LTE, Wi-Fi, external WiMAX dongle, and Satellite to be utilized to connect to the Internet.

This manual presents how to set up the Pepwave MAX Mobile Router and provides an introduction to thefeatures and usage of Pepwave MAX Mobile Router.

Tips

Want to know more about Pepwave MAX? Visit ourYouTube Channel for a video introduction!



http://youtu.be/UCkVQThLKO4

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2 Glossary

The following terms, acronyms, and abbreviations are frequently used in this manual:

Term	Definition
3G	3rd Generation standards for wireless communications (e.g. HSDPA)
4G	4th Generation standards for wireless communications (e.g. WiMAX, LTE)
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
EVDO	Evolution-Data Optimized
HSDPA	High-Speed Downlink Packet Access
HTTP	Hyper-Text Transfer Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC Address	Media Access Control Address
MTU	Maximum Transmission Unit
MSS	Maximum Segment Size
NAT	Network Address Translation
PPPoE	Point to Point Protocol over Ethernet
QoS	Quality of Service
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WINS	Windows Internet Name Service
WLAN	Wireless Local Area Network

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3 Product Features

PepwaveMAX enables all LAN users to share broadband Internet connections, and provide advanced features to enhance Internet access. The following is the list of supported features on Pepwave MAX Mobile Router:

3.1 Supported Network Features

3.1.1 WAN

- Ethernet WAN Connection in Full/Half Duplex
- Static IP support for PPPoE
- Built-in HSPA and EVDO cellular modems **(Available on Pepwave MAX HD2 and HD2 IP67)**
- USB mobile connection(s)
- Wi-Fi WAN connection
- Network address translation (NAT)/ port address translation (PAT)
- Inbound and outbound NAT mapping
- IPsec NAT-T and PPTP packet passthrough
- MAC address clone and passthrough
- Customizable MTU and MSS values
- WAN connection health check
- Dynamic DNS (supported service providers: changeip.com, dyndns.org, no-ip.org, tzo.com and DNS-O-Matic)
- Ping, DNS lookup and HTTP based health check

3.1.2 LAN

- Wi-Fi AP
- Ethernet LAN ports
- DHCP server on LAN
- Extended DHCP option support
- Static routing rules
- VLAN on LAN support

3.1.3 VPN

- SpeedFusion™
- SpeedFusion performance analyzer
- X.509 certificate support **(supported for MAX 700, and MAX HD2, available on the Max BR1 and MAX_OTG_U4_SF as an activated feature)**
- VPN load balancing and failover among selected WAN connections
- Bandwidth bonding & failover among selected WAN connections
- IPsec VPN for Network-to-Network connection (Works with Cisco, Juniper only)
- Ability to route Internet traffic to a remote VPN peer
- Optional pre-shared key setting
- SpeedFusion™ throughput, ping and traceroute tests
- PPTP server

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- PPTP and IPsec passthrough

3.1.4 Firewall

- Outbound (LAN to WAN) firewall rules
- Inbound (WAN to LAN) firewall rules per WAN connection
- Intrusion detection and prevention
- Specification of NAT mappings
- Outbound firewall rules can be defined by destination domain name

3.1.5 Captive Portal

- Splash screen of open networks, login page for secure networks
- Customizable built-in captive portal
- Supports linking to outside page for captive portal

3.1.6 Outbound Policy

- Link load distribution per TCP/UDP service
- Persistent routing for specified source and/or destination IP addresses per TCP/UDP service
- Traffic Prioritization and DSL optimization
- Prioritize and route traffic to VPN tunnels with Priority and Enforced algorithms

3.1.7 AP Controller **(Available on the Pepwave MAX 700 and MAX HD2)**

- Configure and manage Pepwave AP devices
- Review the status of connected AP

3.1.8 QoS

- Quality of Service for different applications and custom protocols
- User Group classification for different service levels
- Bandwidth usage control and monitoring on group- and user- level
- Application Prioritization for custom protocols and DSL/Cable optimization

3.2 Other Supported Features

- User-friendly web-based administration interface
- HTTP and HTTPS support for Web Admin Interface
- Configurable web administration port and administrator password
- Firmware upgrades, configuration backups, Ping, and Traceroute via Web Admin Interface
- Remote web based configuration (via WAN and LAN interfaces)
- Time server synchronization
- SNMP
- Email notification

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- Read-only user for Web Admin
- Shared IP drop-in mode **(Available on the Pepwave MAX 700 and MAX HD2)**
- Authentication and Accounting by RADIUS server for Web Admin
- Built-in WINS Servers
- Syslog
- SIP passthrough
- PPTP packet passthrough
- Event Log
- Active Sessions
- Client List
- WINS Client List
- UPnP / NAT-PMP
- Real-Time, Hourly, Daily and Monthly Bandwidth Usage reports and charts
- IPv6 support**(Available on Pepwave MAX 700, HD2 and HD2 IP67)**
- Support USB tethering on Android 2.2+ phones

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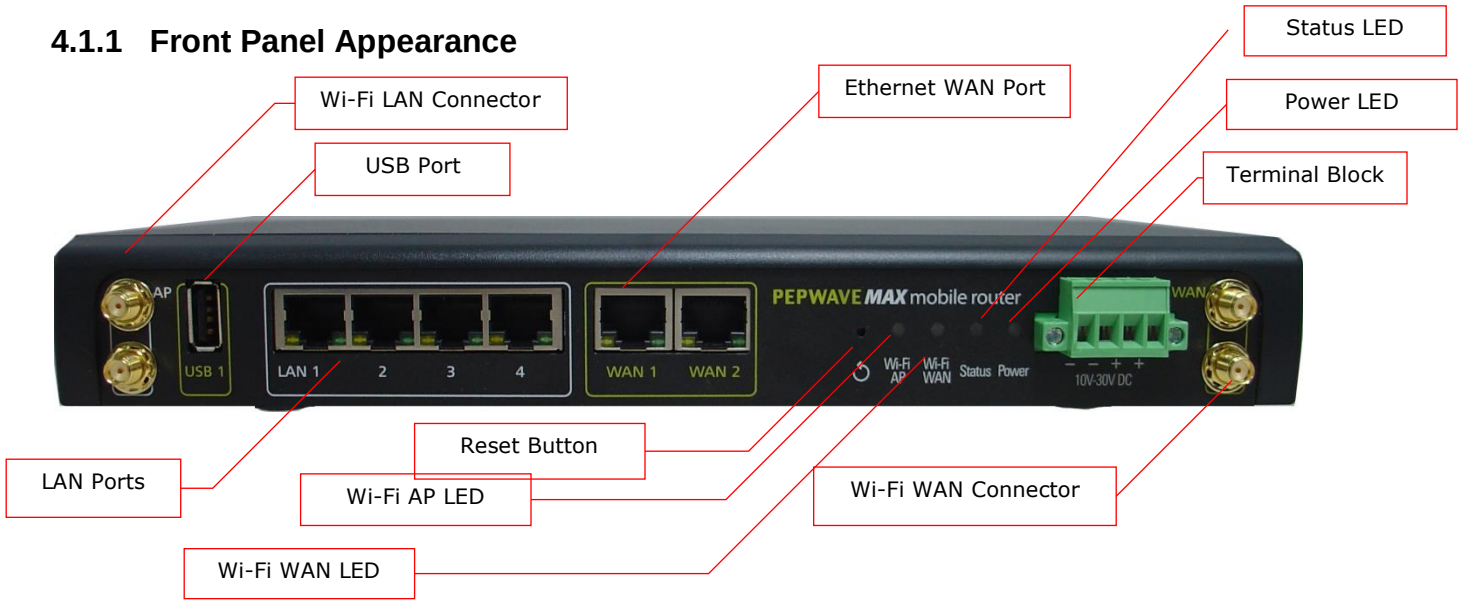
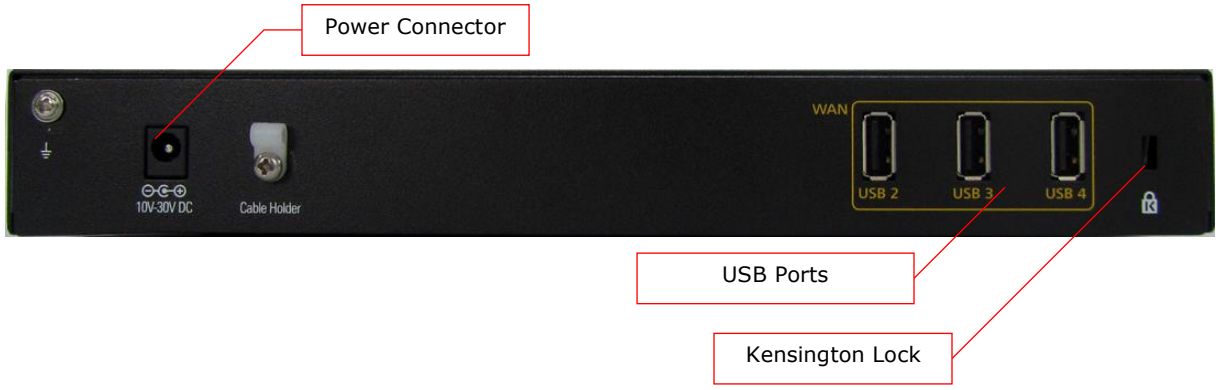
4 Pepwave MAX Mobile Router Overview

4.1 MAX 700

4.1.1 Front Panel Appearance



4.1.2 Rear Panel Appearance



4.1.3 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi AP and Wi-Fi WAN Indicators		
Wi-Fi WAN	OFF	Disconnected

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Wi-Fi AP	Blinking slowly	Connecting to network
	Blinking	Connected to network with traffic
	ON	Connected to network without traffic
	OFF	Disabled
	Blinking slowly	Enabled but no client connected
	Blinking	Connected to network with traffic
	ON	Client(s) connected to wireless network

LAN and Ethernet WAN Ports		
Green LED	ON	10 / 100/ 1000 Mbps
Orange LED	Blinking	Data is transferring
	OFF	No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports	

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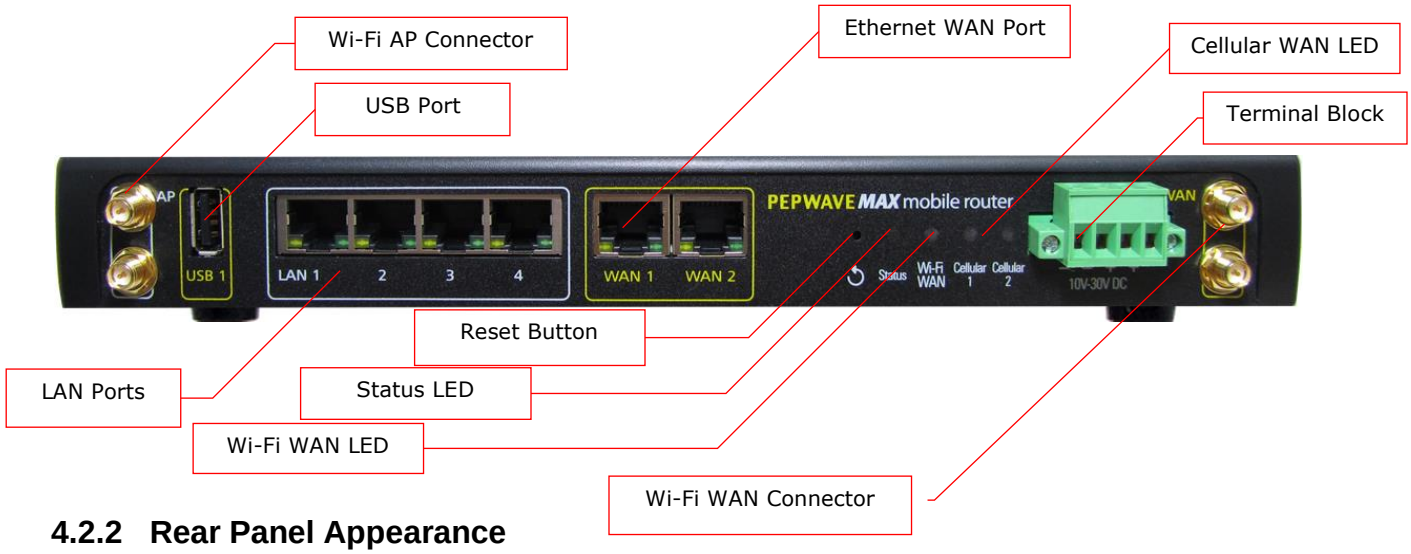
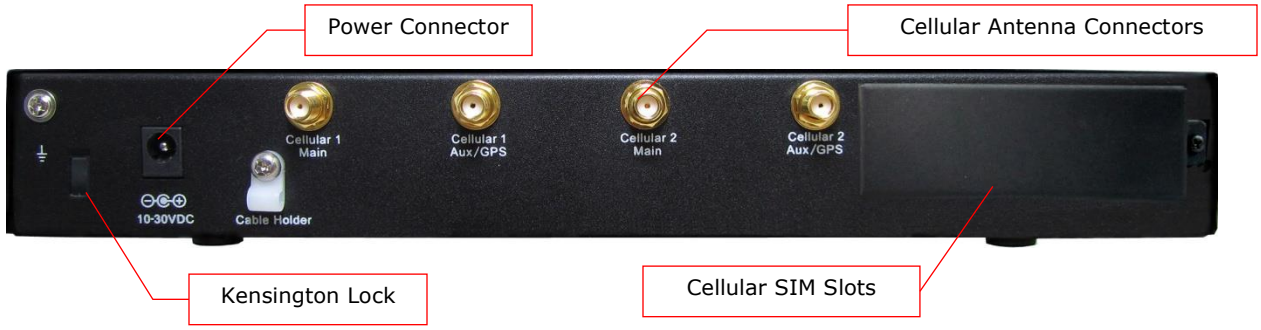
4.2 MAX HD2

4.2.1 Front Panel Appearance



4.2.2 Rear Panel Appearance



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4.2.3 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi AP and Wi-Fi WAN Indicators		
Wi-Fi WAN / Cellular 1 / Cellular 2	OFF	Disabled Intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

LAN and Ethernet WAN Ports		
Green LED	ON	10 / 100 / 1000 Mbps
Orange LED	Blinking	Data is transferring
	OFF	No data is being transferred or port is not connected
Port Type	Auto MDI/MDI-X ports	

4.3 MAX HD2 IP67

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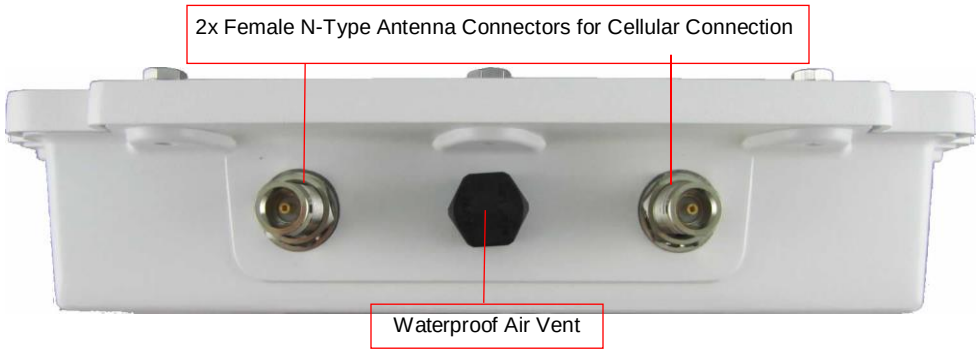
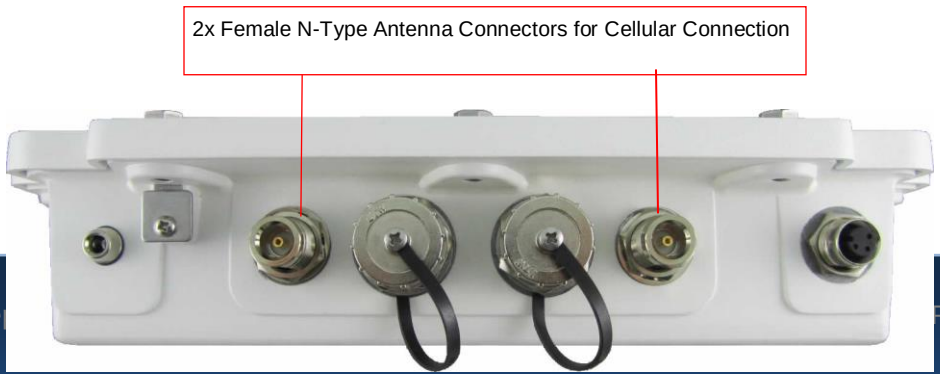
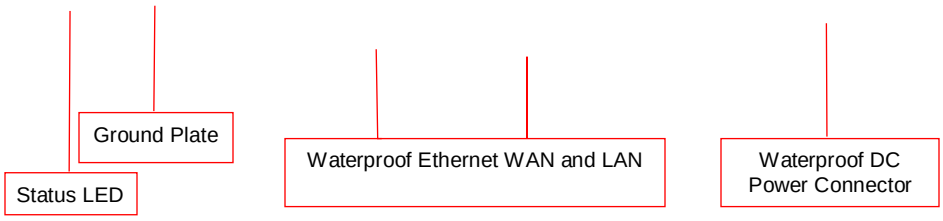
4.3.1 Front Panel Appearance

4.3.2 Top Panel Appearance



4.3.3 Rear Panel Appearance





The statuses indicated by the front panel LEDs are as follows:

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

4.4 MAX BR1

4.4.1 Front Appearance

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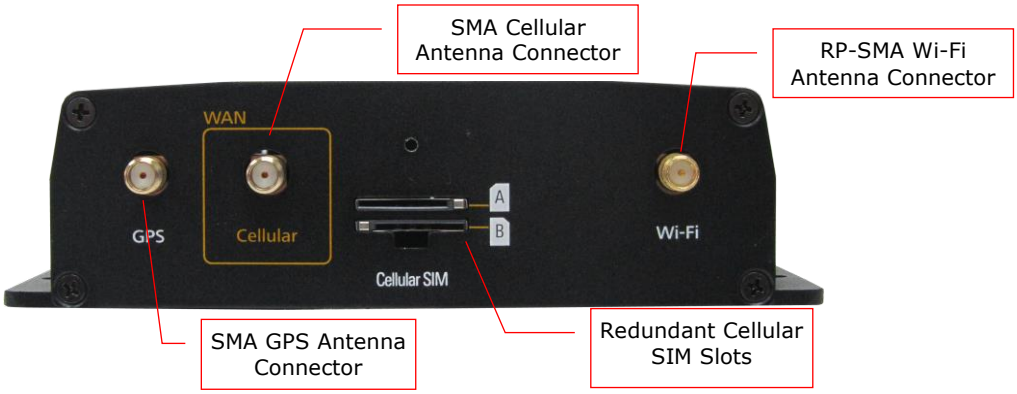
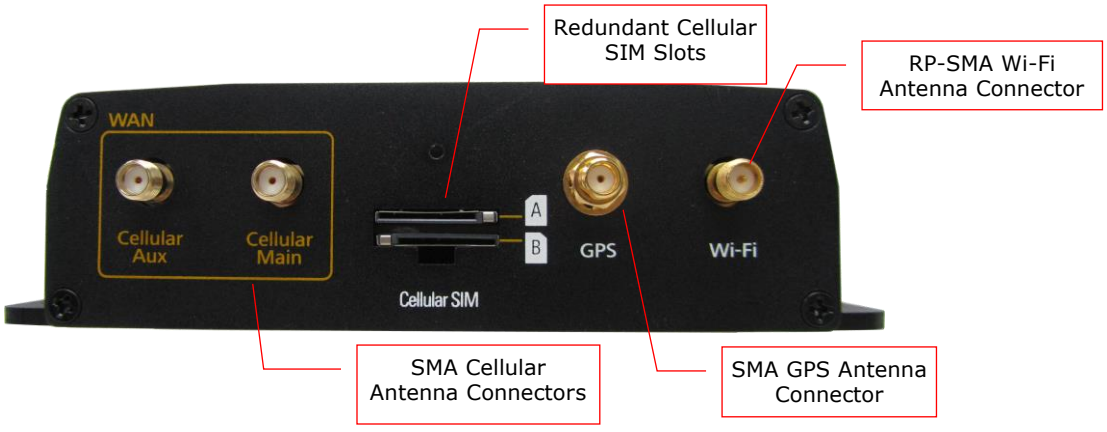
4.4.2 Top Panel Appearance

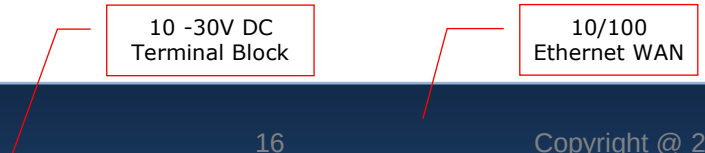
(MAX-BR1 Version)



(MAX-BR1-LTE Version)



4.4.3 Rear Panel Appearance



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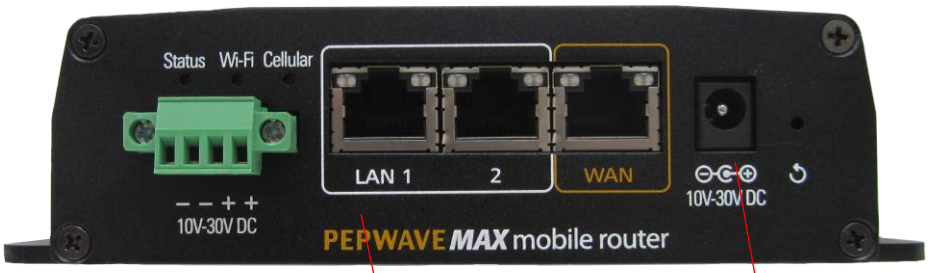

Dual 10/100 Ethernet LAN

10 – 30V DC Connector

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4.4.4 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Blinking red	Boot up error
	Green	Ready

Wi-Fi Indicators		
Wi-Fi	OFF	Disabled Intermittent
	Blinking slowly	Connecting to wireless network(s)
	Blinking	Connected to wireless network(s) with traffic
	ON	Connected to wireless network(s) without traffic

Cellular Indicators		
Cellular	OFF	Disabled or no SIM card inserted
	ON	Connecting or connected to network(s)

LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps
	OFF	10 Mbps
Orange LED	ON	Port is connected without traffic
	Blinking	Data is transferring
	OFF	Port is not connected
Port Type	Auto MDI/MDI-X ports	

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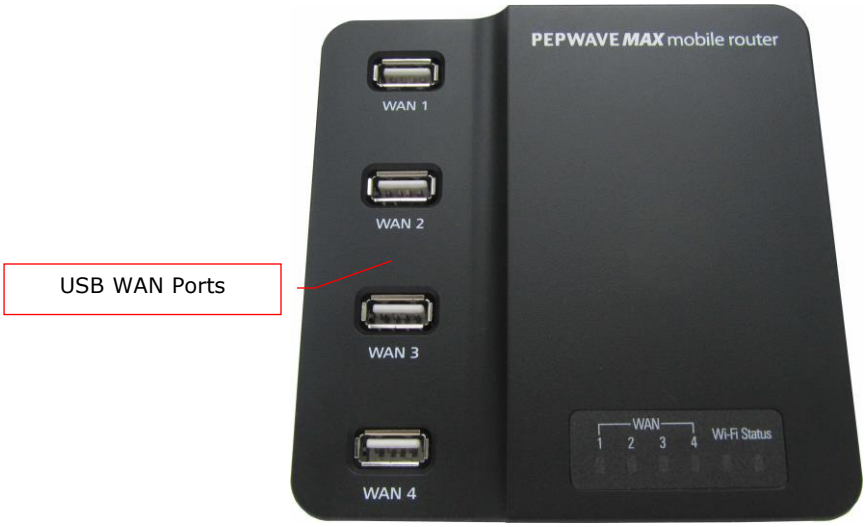
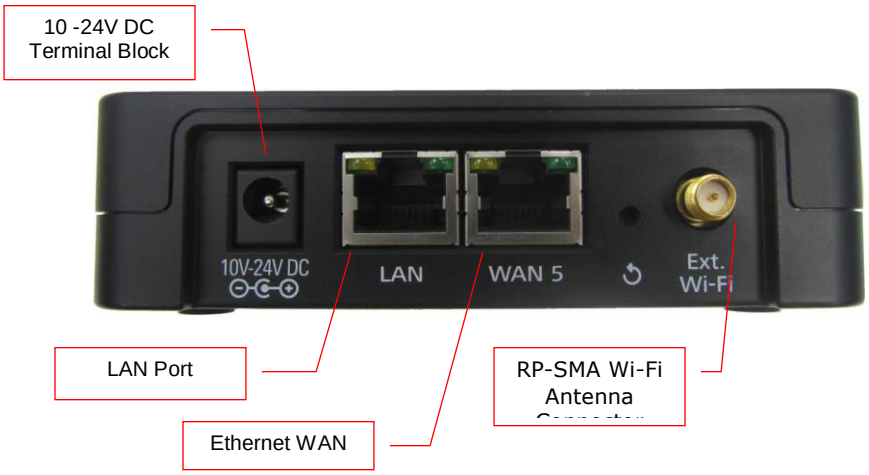
4.5 MAX On-The-Go

4.5.1 Top Panel Appearance



4.5.2 Rear Panel Appearance



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4.5.3 LED Indicators

The statuses indicated by the front panel LEDs are as follows:

Cellular Indicators		
WAN	OFF	Modem is not attached to the port.
	Green	Modem is attached to the port.

Wi-Fi Indicators		
Wi-Fi	OFF	Disconnected to AP.
	Green	Connected to AP.

Status Indicators		
Status	OFF	System initializing
	Red	Booting up or busy
	Green	Ready

LAN and Ethernet WAN Ports		
Green LED	ON	100 Mbps
	OFF	10 Mbps
Orange LED	ON	Port is connected without traffic
	Blinking	Data is transferring
Port Type	Auto MDI/MDI-X ports	

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5 Installation

The following section details connecting the Pepwave MAX Mobile Router to your network:

5.1 Preparation

Before installing your Pepwave MAX Mobile Router, please prepare the following:

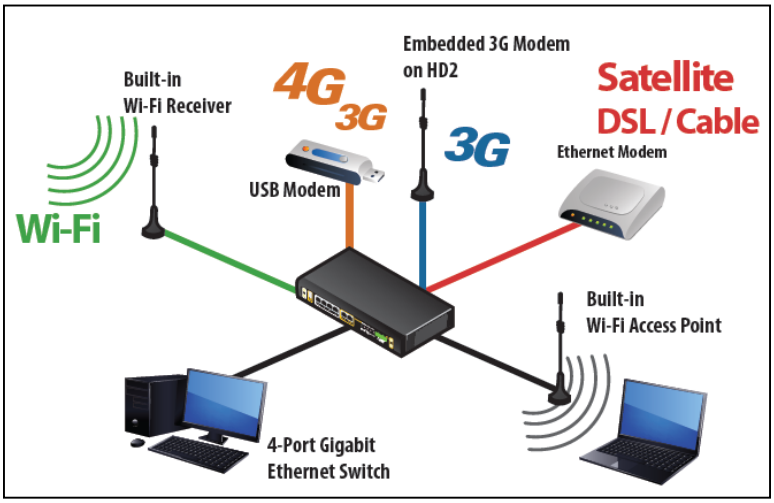
- At least one Internet/WAN access account and/or Wi-Fi access information.
- For each network connection,
  - **Ethernet WAN**: A 10/100/1000BaseT UTP cable with RJ45 connector
  - **USB**: A USB modem
  - **Embedded Modem**: A SIM card for GSM/HSPA service
  - **Wi-Fi WAN**: Wi-Fi antennas
  - **PC Card / Express Card WAN:** A PC Card/Express Card for the corresponding card slot.
- A computer with TCP/IP network protocol and a web browser installed. Supported browsers include Microsoft Internet Explorer 8.0 or above, Mozilla Firefox 10.0 or above, Apple Safari 5.1 or above, and Google Chrome 18 or above.

5.2 Constructing the Network

At the high level, construct the network according to the following steps:

1. With an Ethernet cable, connect a computer to one of the LAN ports on the Pepwave MAX. Repeat with different cables for up to 4 computers to be connected.
2. With another Ethernet cable or a USB modem / Wi-Fi antenna / PC Card / Express Card, connect it to one of the WAN ports on the Pepwave MAX. Repeat the same procedure for other WAN ports.
3. Connect the power adapter to the power connector on the rear panel of the Pepwave MAX, and then plug it into a power outlet.

The following figure schematically illustrates the configuration that results:



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5.3 Configuring the Network Environment

To ensure that the Pepwave MAX works properly in the LAN environment and can access the Internet via the WAN connections, please refer to the following setup procedures:

- LAN Configuration

  For basic configuration, refer to Section6,Connecting to Web Admin Interface.

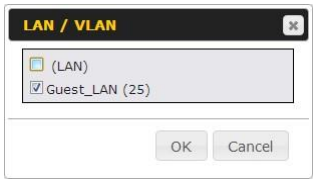
  For advanced configuration, go to Section7, Configuration of LAN Interface(s).

- WAN Configuration

  For basic configuration, refer to Section6, Connecting to Web Admin Interface.

  For advanced configuration, go to Section 7.2,Captive Portal

- The Captive Portal serves as gateway that clients have to pass if they wish to access the internet using your router. To configure, navigate to **Network > Captive Portal** to see the following screen:

Captive Portal Settings	
Apply On	Clicking the **edit** button trigger a dialogue where you can choose which LAN / VLAN to apply your captive portal.  Click all LAN / VLAN that you wish to apply the captive portal to.
Access Mode	Click **Open Access** to allow clients to freely access your router. Click **User Authentication** to force your clients to authenticate before accessing your router.

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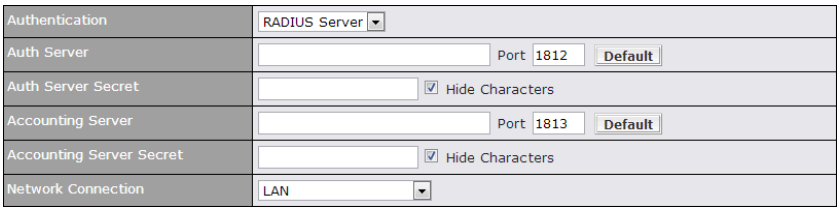
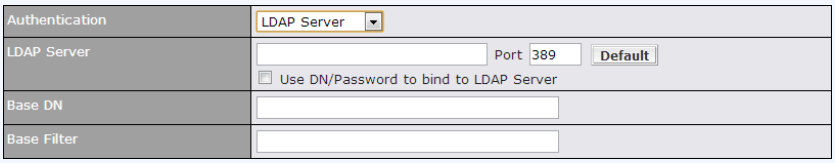
Radius Server	This authenticates your clients through a Radius Server. Upon selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.
LDAP Server	This authenticates your clients through a LDAP Server. Upon selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.
Access Quota	Set a time and data cap to each user's Internet usage.
Quota Reset Time	This menu determines how your usage quota resets. Setting it to **daily** will reset it at a specified time every day. Setting a number of **minutes after quota reached** establish a timer for each user that begins after the quota has been reached.
Splash Page	Here, you can choose between using the MAX router's built-in captive portal and redirecting clients to a URL you define.

The Portal Customization menu has two options: and . Clicking will result in a pop-up previewing the captive portal that your clients will see. Clicking will result in the appearance of following menu:

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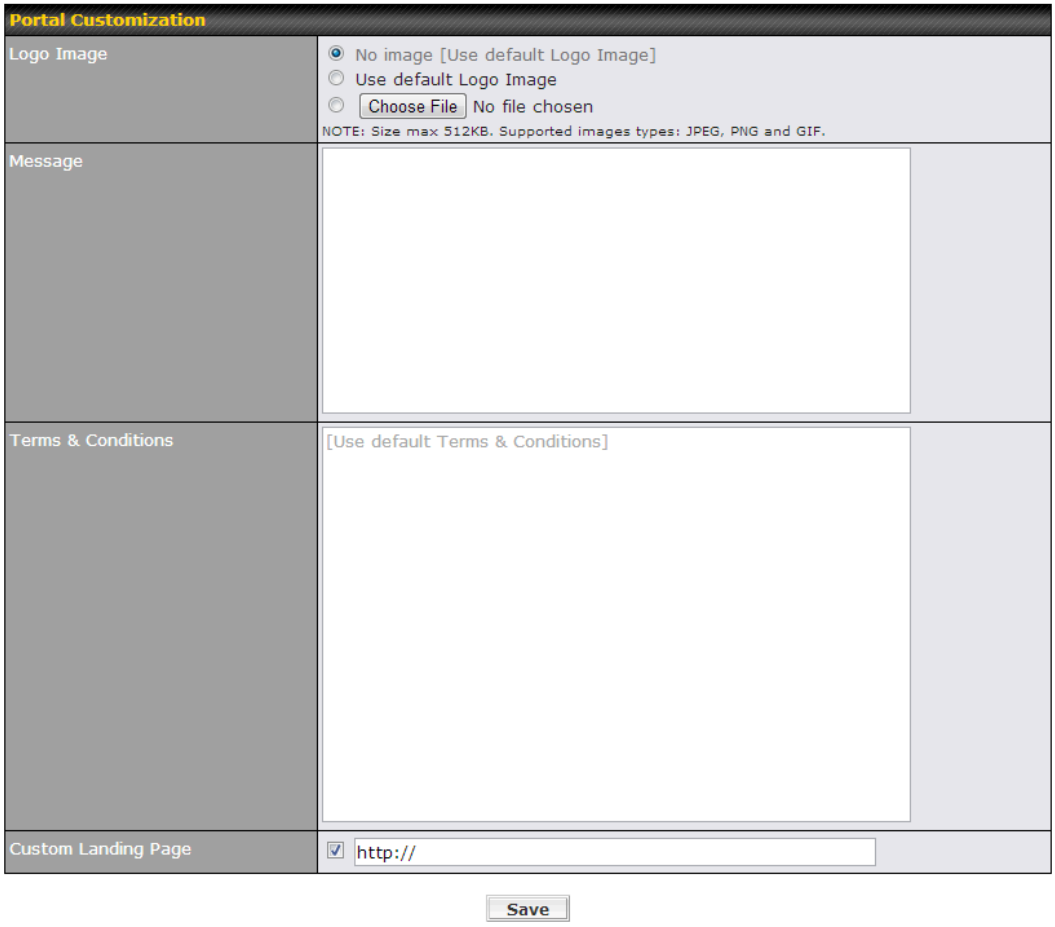

Portal Customization	
Logo Image	Click the **Choose File** button to select an logo to use for the built-in portal
Message	If you have any additional messages for your users, place it on this field.
Terms & Conditions	If you would like to use your own set of terms and conditions, please place it here. If left empty, the built-in portal will display the default terms and conditions.
Custom Landing Page	Fill in this field to redirect clients to an external URL.

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6 Configuration of WAN Interface(s)

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6.1 Mounting the Unit

6.1.1 Wall Mount

The Pepwave MAX 700/HD2/On-The-Go can be mounted on the wall by screwing. After adding the screw on the wall, slide the MAX in the screw whole socket as indicated below. Recommeneded Screw Specification: M3.5 x 20mm, Head Diameter 6mm, Head Thickness 2.4mm

The Pepwave MAX BR1 can be mounted by screwing the four holes on the device to the wall.

6.1.2 Car Mount

The Pepwave MAX700/HD2 can be mounted in a vehicle using the included mounting brackets. Place the mounting brackets by the two sides, and screw it onto the device.

7 Connecting to Web Admin Interface

1. Start a Web browser on a computer that is connected with the Pepwave MAX through LAN.
2. To connect to Web Admin Interface of the Pepwave MAX, enter the following LAN IP address in the address field of the web browser:

   http://192.168.50.1

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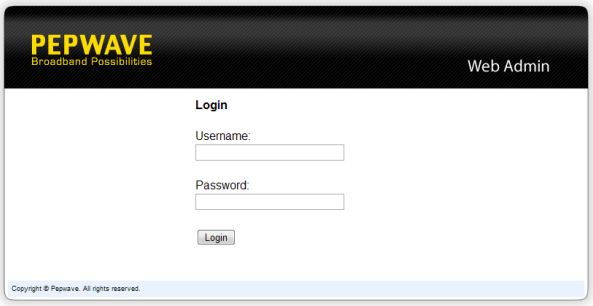
(This is the default LAN IP address of the Pepwave MAX.)

3. Enter the following to access the Web Admin Interface.

Username: admin

Password: admin

(This is the default Username and Password of the Pepwave MAX. The Admin and Read-only User Password can be changed at ***System > Admin Security*** of the Web Admin Interface.)



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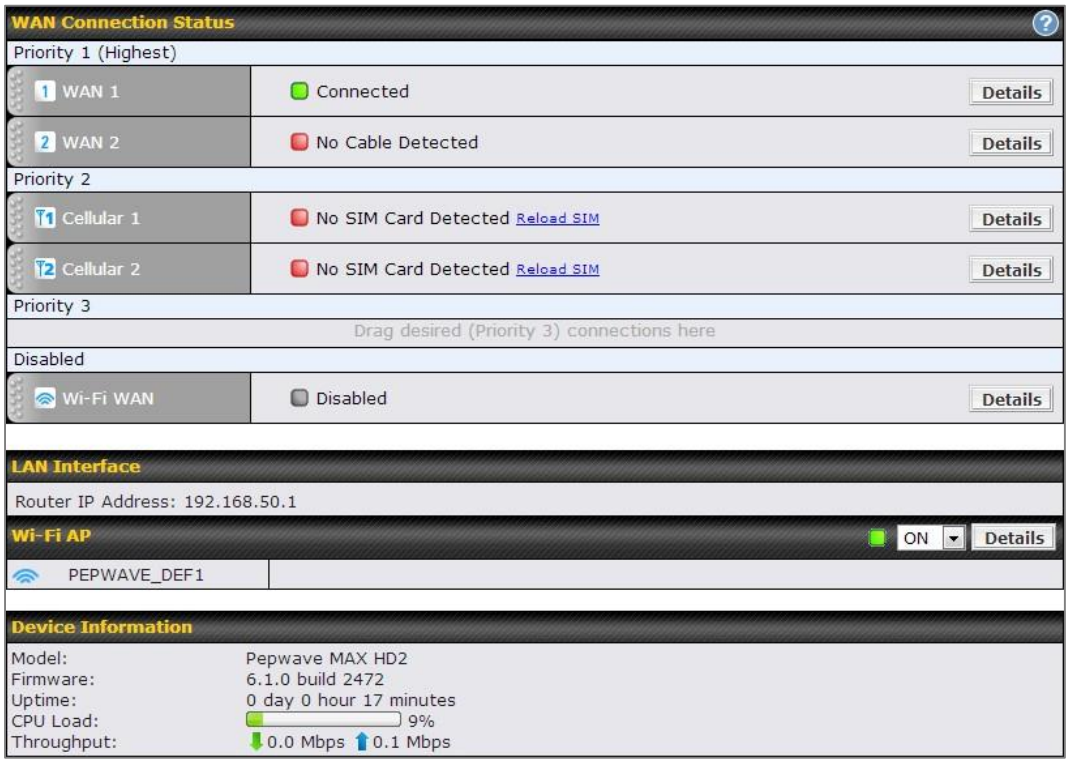
4. After successful login, the **Dashboard** of the Web Admin Interface will be displayed:



The ***Dashboard*** shows the current WAN, LAN, Wi-Fi AP settings and status. Here, you can change priority of WAN connections and switch on / off Wi-Fi AP. For further information on how-to set up these connections, please refer to Section 0 and 8.2.

Device Information shows the details about the device, including Model name, Firmware version and Uptime. For further information, please refer to Section 21.

Important Note
Configuration changes (e.g. WAN, LAN, Admin settings, etc.) will only take effect after clicking the **Save** button at the bottom of each page. The **Apply Changes** button causes the changes to be saved and applied.

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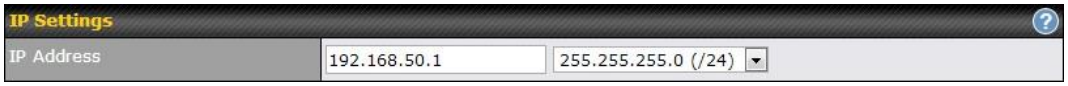
8 Configuration of LAN Interface(s)

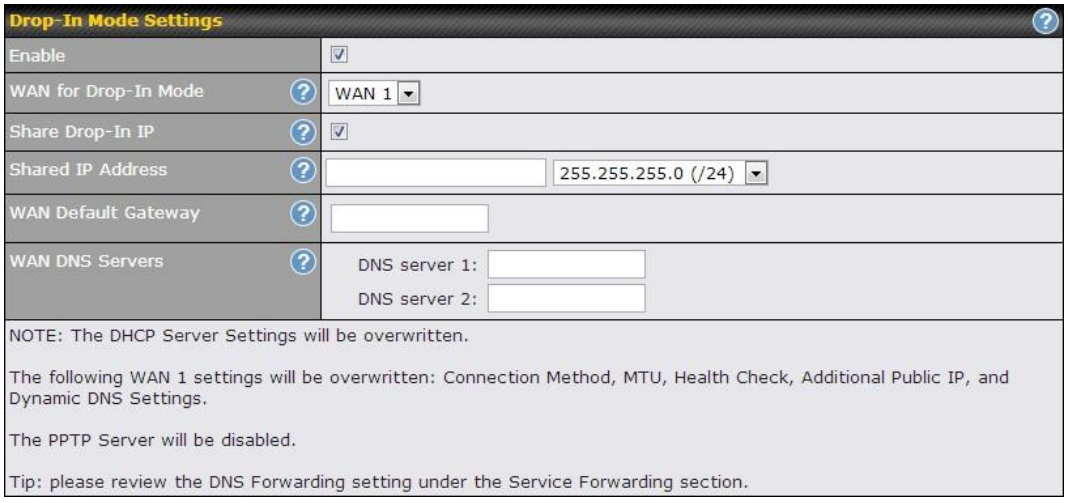
8.1 Basic Settings

The LAN Interface settings are located in ***Network> LAN>Basic Settings***



IP Settings	
IP Address	The IP address of the Pepwave MAX on LAN.
Speed	This setting specifies the speed of the LAN Ethernet Port. By default, **Auto** is selected and the appropriate data speed is automatically detected by the Pepwave MAX. In the event of negotiation issues, the port speed can be manually specified to circumvent the issues. You can also choose whether or not to advertise the speed to the peer by selecting the **Advertise Speed** checkbox.

Port Settings	
Speed	This is the port speed of the LAN interface. It should be set to the same speed as the connected device to avoid any port negotiation problem. When a static speed is set, you may choose whether to advertise its speed to the peer device or not. *Advertise Speed* is selected by default. You can choose not to advertise the port speed if the port has difficulty in negotiating with the peer device.


Drop-In Mode Settings
Enable
WAN for Drop-In Mode
WAN 1
Share Drop-In IP
Shared IP Address
255.255.255.0 (/24)
WAN Default Gateway
WAN DNS Servers
DNS server 1:
DNS server 2:
NOTE: The DHCP Server Settings will be overwritten.
The following WAN 1 settings will be overwritten: Connection Method, MTU, Health Check, Additional Public IP, and Dynamic DNS Settings.
The PPTP Server will be disabled.
Tip: please review the DNS Forwarding setting under the Service Forwarding section.

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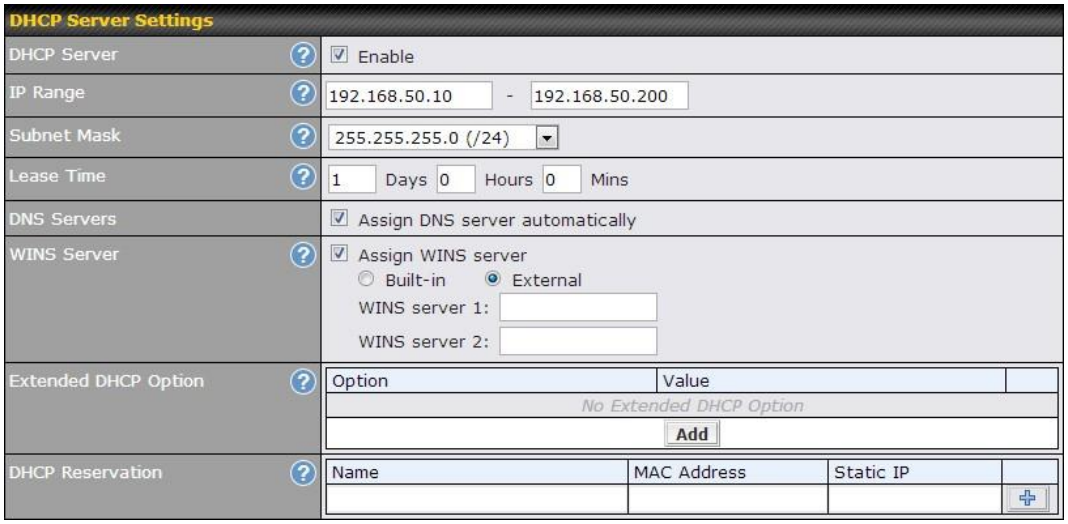
Drop-in Mode Settings	
Enable	Drop-in Mode eases the installation of the Peplink MAX on a live network between the existing firewall and router, such that no configuration changes are required on existing equipment. Check the box to enable the Drop-in Mode feature. Please refer to **Section**Error! Reference source not found.**,** Error! Reference source not found. for details.
WAN for Drop-In Mode	Select the WAN port to be used for Drop-in Mode. If **WAN 1 with LAN Bypass** is selected, the High Availability feature will be disabled automatically.
Shared Drop-In Mode [A]	When this option is enabled, the passthrough IP address will be used to connect to WAN hosts (email notification, remote syslog, etc.). The MAX Router will listen for this IP address when WAN hosts access services provided by the MAX Router (Web Admin access from the WAN, DNS server requests, etc.). To connect to hosts on the LAN (email notification, remote syslog, etc.), the default gateway address will be used. The MAX Router will listen for this IP address when LAN hosts access services provided by the MAX Router (Web Admin access from the WAN, DNS proxy, etc.).
Shared IP Address [A]	Access to this IP address will be passed through to the LAN port if this device is not serving the service being accessed. The shared IP Address will be used in connecting to hosts on the WAN (e.g. email notification, remote syslog, etc.) The device will also listen on the IP address when hosts on the WAN access services served on this device (e.g. web admin accesses from WAN, DNS server, etc.)
WAN Default Gateway	Enter the WAN router's IP address in this field. If there are more hosts in addition to the router on the WAN segment, check the I **have other host(s) on WAN segment** box and enter the IP address of the hosts that need to access LAN devices or be accessed by others.
WAN DNS Servers	Enter the selected WAN's corresponding DNS server IP addresses.

[A] - Advanced feature, please click the button on the top right hand corner to activate.



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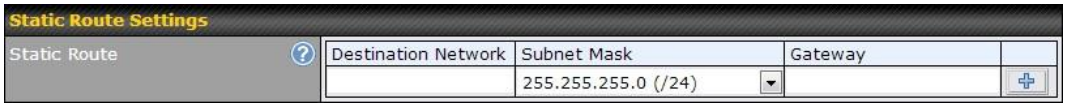
DHCP Server Settings	
DHCP Server	When this setting is enabled, the DHCP server of the Pepwave MAX automatically assigns an IP address to each computer that is connected via LAN and is configured to obtain an IP address via DHCP. The Pepwave MAX's DHCP server can prevent IP address collision on the LAN.
IP Range & Subnet Mask	These settings allocate a range of IP address that will be assigned to LAN computers by the DHCP server of the Pepwave MAX.
Lease Time	This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of the Lease Time, the assigned IP address will no longer be valid and the renewal of the IP address assignment will be required.
DNS Servers	This option allows you to input the DNS server addresses to be offered to the DHCP clients. If **Assign DNS server automatically** is selected, the Pepwave MAX's built-in DNS server address (i.e. LAN IP address) will be offered.
WINS Server	This option allows you to specify the Windows Internet Name Service (WINS) server. You may choose to use the **built-in WINS server** or **external WINS servers**. When this unit is connected using SpeedFusion™, other VPN peers can share this unit's built-in WINS server by entering this unit's LAN IP address in their DHCP WINS Servers setting. Therefore, all PC clients in the VPN can resolve the NetBIOS names of other clients in remote peers. If you have enabled this option, a list of WINS clients will be displayed at ***Status > WINS Clients***.
Extended DHCP Option	In addition to standard DHCP options (e.g. DNS server address, gateway address, subnet mask), you can specify the value of additional extended DHCP options, as defined in RFC 2132. With these extended options enabled, you can pass additional configuration information to LAN hosts. To define an extended DHCP option, click the **Add** button, choose the option that you want to define and enter its value. For values that are in IP address list format, you can enter one IP address per line in the provided text area input control. Each option is allowed to be defined once only.
DHCP Reservation	This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-reference list between the computers' names, MAC addresses and fixed IP addresses. **Name** (an optional field) allows you to specify a name to represent the device. MAC addresses should be in the format of **00:AA:BB:CC:DD:EE** Press to create a new record. Press to remove a record Reserved clients information can be imported from the Client List, located at ***Status > Client List***. For more details, please refer to section 21.3.



Static Route Settings	
Static Route	This table is for defining static routing rules for the LAN segment. A static route consists of the network address, subnet mask, and gateway address. The address and subnet mask

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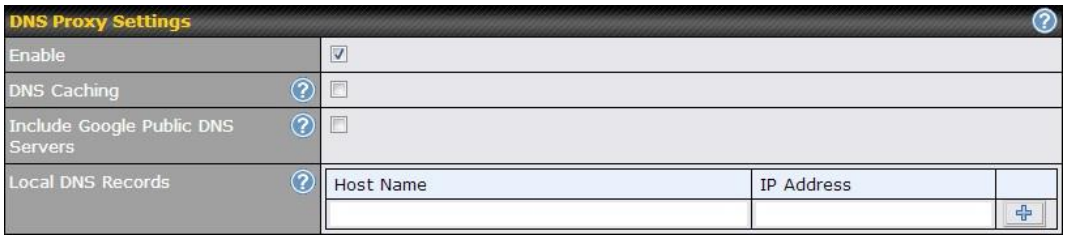
	values are in w.x.y.z format. The local LAN subnet and subnets behind the LAN will be advertised to the VPN. Remote routes sent over the VPN will also be accepted. Any VPN member will be able to route to the local subnets. Press to create a new route. Press to remove a route.

WINS Server Settings	
Enable	Check the box to enable the WINS Server. A list of WINS clients will be displayed at **Status > WINS Clients**.



DNS Proxy Settings	
Enable	A check box to enable to DNS Proxy feature. ***Network > LAN > DNS Proxy Settings table*** A DNS proxy server can be enabled to serve DNS requests originating from LAN/PPTP/ SpeedFusion™peers. Requests are forwarded to the **DNS servers/resolvers** defined in each WAN connection
DNS Caching	This field is to enable DNS caching on the built-in DNS proxy server. When the option is enabled, queried DNS replies will be cached until the records' TTL has been reached. This feature can help improve the DNS lookup time. However, it cannot return the most updated result for those frequently updated DNS records. By default, it is **disabled**.
Include Google Public DNS Servers	When this option is **enabled**, the DNS proxy server will also forward DNSrequests to Google's Public DNS Servers in addition to the DNS servers defined in each WAN. This could increase the DNS service's availability. Default: **disabled**
Local DNS Records	This table is for defining custom local DNS records. A static local DNS record consists of a Host Name and an IP Address. When looking up the Host Name from the LAN to LAN IP of the Pepwave MAX, the corresponding IP Address will be returned.

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	Press to create a new record. Press to remove a record.
LAN DNS Resolver Settings	Check the box to enable the WINS Server. A list of WINS clients will be displayed at ***Network > LAN > DNS Proxy Settings > DNS Resolvers***. This field specifies which DNS resolvers will receive forwarded DNS requests. If no WAN/VPN/LAN DNS resolver is selected, all of the WAN's DNS resolvers will be selected. If a SpeedFusion™ peer is selected, you may enter the VPN peer's DNS resolver IP address(es). Queries will be forwarded to the selected connections' resolvers. If all of the selected connections are down, queries will be forwarded to all resolvers on healthy WAN connections.

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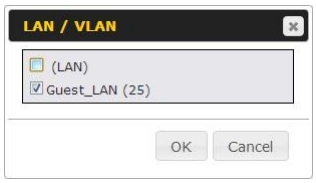
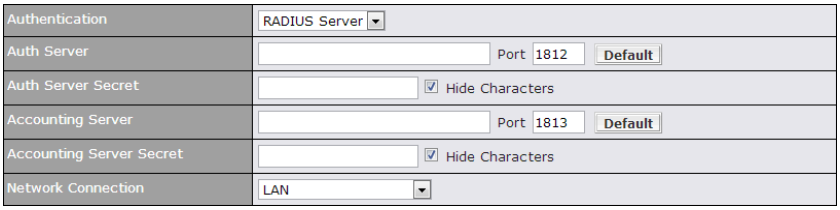
8.2 Captive Portal

The Captive Portal serves as gateway that clients have to pass if they wish to access the internet using your router. To configure, navigate to **Network > Captive Portal** to see the following screen:

Captive Portal Settings	
Apply On	Clicking the **edit** button trigger a dialogue where you can choose which LAN / VLAN to apply your captive portal.  Click all LAN / VLAN that you wish to apply the captive portal to.
Access Mode	Click **Open Access** to allow clients to freely access your router. Click **User Authentication** to force your clients to authenticate before accessing your router.
Radius Server	This authenticates your clients through a Radius Server. Upon selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.

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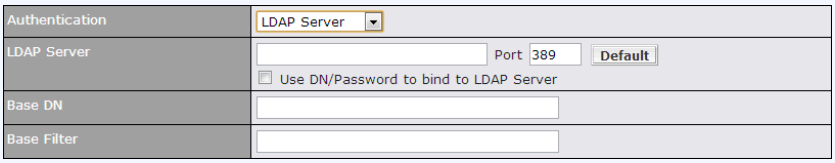
LDAP Server	This authenticates your clients through a LDAP Server. Upon selecting this option, you will see the following fields:  Fill in the necessary information to complete your connection to the server and enable authentication.
Access Quota	Set a time and data cap to each user's Internet usage.
Quota Reset Time	This menu determines how your usage quota resets. Setting it to **daily** will reset it at a specified time every day. Setting a number of **minutes after quota reached** establish a timer for each user that begins after the quota has been reached.
Splash Page	Here, you can choose between using the MAX router's built-in captive portal and redirecting clients to a URL you define.

The Portal Customization menu has two options:

and . Clicking will result in a pop-up previewing the captive portal that your clients will see. Clicking will result in the appearance of following menu:

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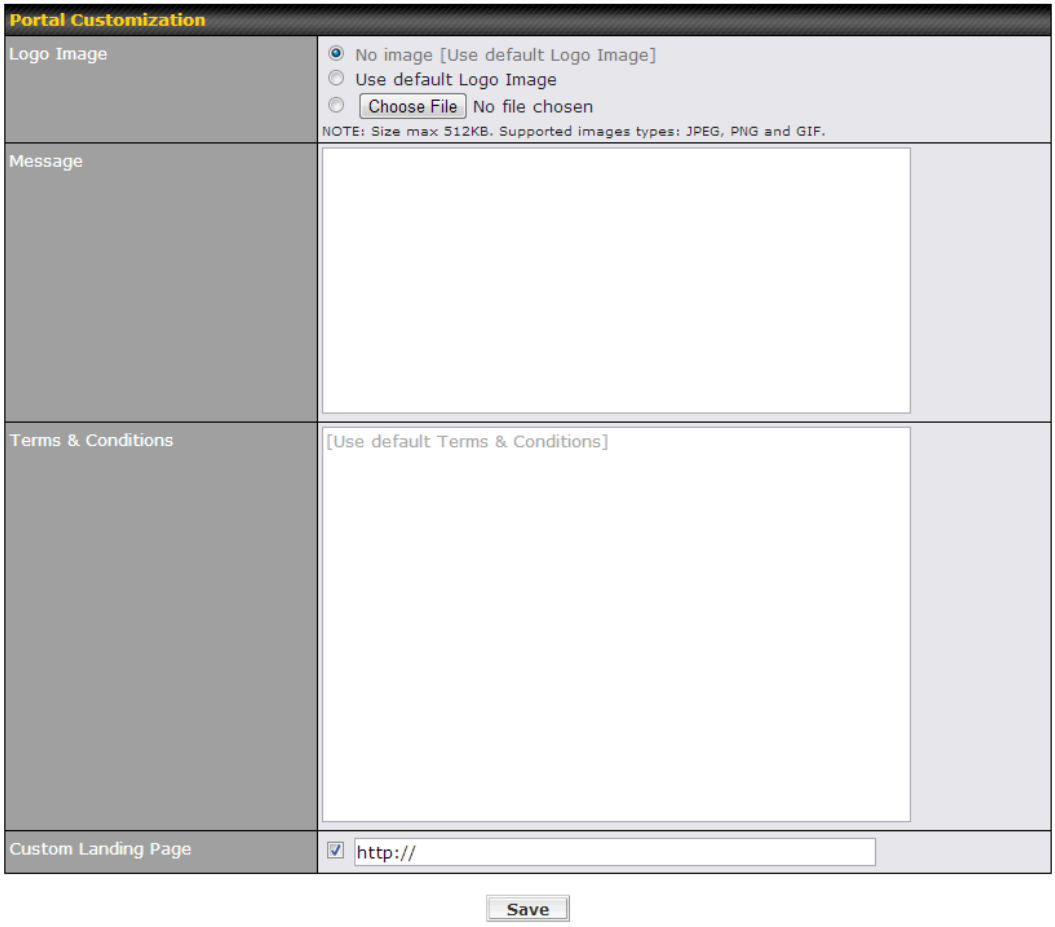

Portal Customization	
Logo Image	Click the **Choose File** button to select an logo to use for the built-in portal
Message	If you have any additional messages for your users, place it on this field.
Terms & Conditions	If you would like to use your own set of terms and conditions, please place it here. If left empty, the built-in portal will display the default terms and conditions.
Custom Landing Page	Fill in this field to redirect clients to an external URL.

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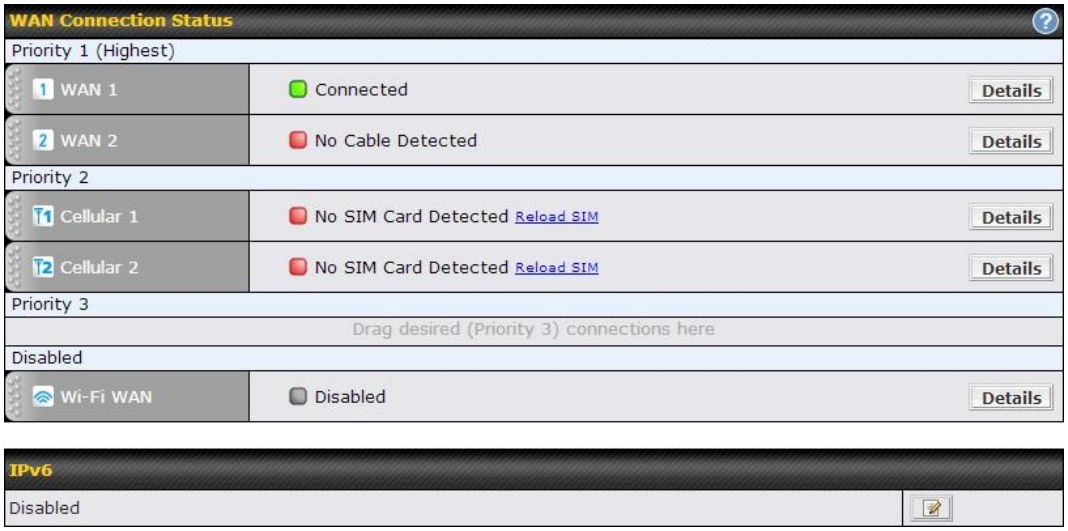
9 Configuration of WAN Interface(s)

The WAN Interface settings are located at: ***Network > WAN***

To reorder different WANs' priority, just drag on the appropriate WAN by holding the left mouse button, move it to the desired priority (the first one would be the highest priority, the second one would be lower priority and so on) and drop it by releasing the mouse button.



To disable a particular WAN connection, just drag on the appropriate WAN by holding the left mouse button, move it the **Disabled** row and drop it by releasing the mouse button.
You can also do the above priority setting on the ***Dashboard***, please refer to Section 0 for information.
Click the **Details** button in the corresponding row of connection to modify the connection setting.

Important Note
Connection Details will be changed and become effective right after clicking the **Save and Apply** button.

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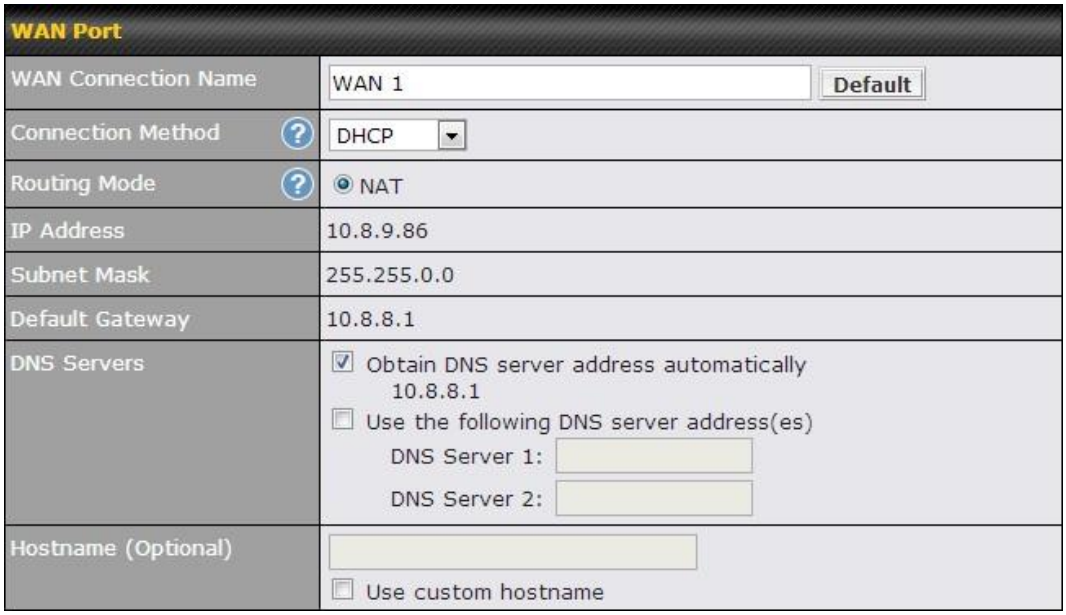
9.1 Ethernet WAN

From ***Network > WAN,*** choose a WAN connection and click the Details button:



WAN Port – 1	
WAN Connection Name	This field is for defining a name to represent this WAN connection.
Connection Method	There are three possible connection methods for Ethernet WAN: • **DHCP** • **Static IP** • **PPPoE** The connection method and details are determined by, and can be obtained from, the ISP. See the Sections **9.1.1, 9.1.2, and 9.1.3** for details of each connection method.

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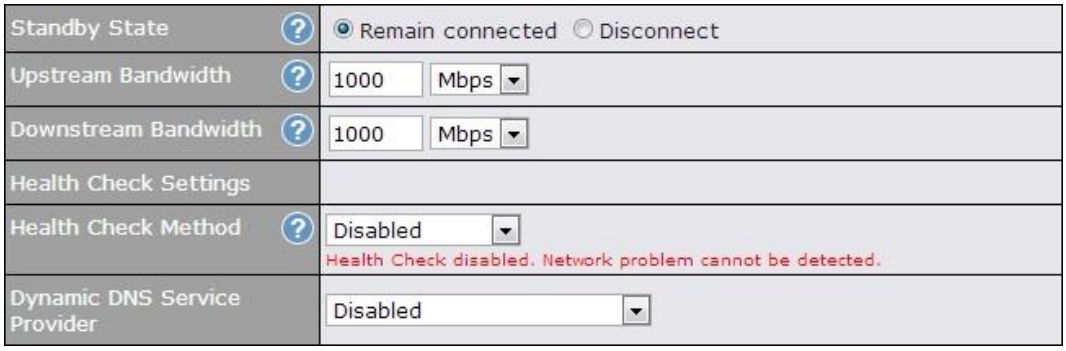

WAN Port – 2	
Standby State	This setting specifies the state of the WAN connection. The available options are **Remain connected** and **Disconnect**. The default state is **Remain Connected**.
Upstream Bandwidth	This setting specifies the data bandwidth in the outbound direction from the LAN through the WAN interface.
Downstream Bandwidth	This setting specifies the data bandwidth in the inbound direction from the WAN interface to the LAN. This value is referenced as the default weight value when using the algorithm **Least Used**, or the algorithm **Persistence (Auto)** in Outbound Policy with **Managed by Custom Rules** chosen (see Section 13.2).
Health Check Method	This setting specifies the health check method for the WAN connection. The value of method can be configured as **Disabled**, **Ping** or **DNS Lookup**. The default method is **Disabled**. See Section9.4 for configuration details.
Dynamic DNS Service Provider	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature. See Section 1.1 for configuration details.

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WAN Port – 3	
Bandwidth Allowance Monitor	This option allows you to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this is not enabled, bandwidth usage of each month is still being tracked but no action will be taken. See Section 9.5 for configuration details. (Action, Start Day, Monthly Allowance)
Port Speed	This setting specifies port speed and duplex configurations of the WAN Port. By default, **Auto** is selected and the appropriate data speed is automatically detected by the Pepwave MAX. In the event of negotiation issues, the port speed can be manually specified to circumvent the issues. You can also choose whether or not to advertise the speed to the peer by selecting the **Advertise Speed** checkbox.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the default MTU value. Select **Auto** and the appropriate MTU value will be automatically detected. The auto-detection will run each time when the WAN connection establishes.

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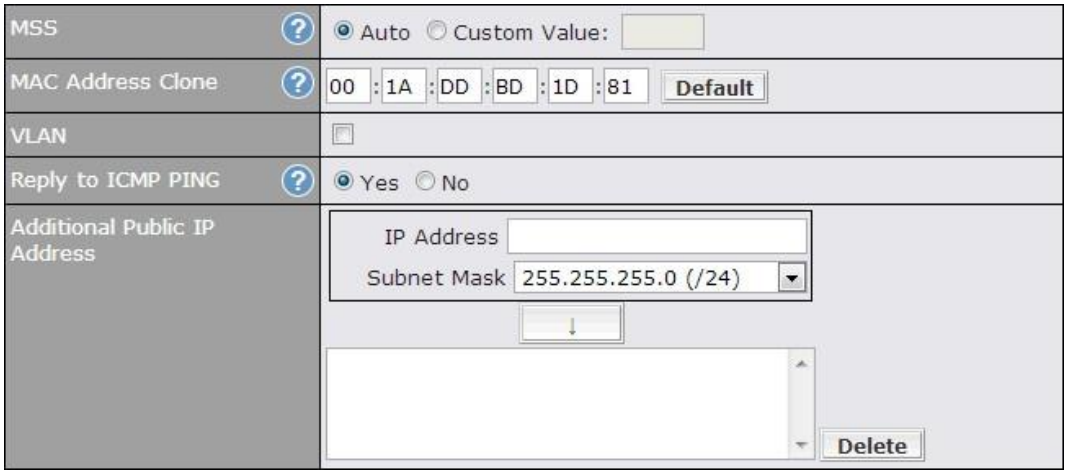

WAN Port – 5	
MSS	This setting should be configured based on the maximum payload size that the local system can handle. The MSS (Maximum Segment Size) is computed from the MTU minus 40 bytes for TCP over IPv4. If MTU is set to Auto, the MSS will also be set automatically. By default, MSS is set to **Auto**.
MAC Address Clone	This setting allows you to configure the MAC address. Some service providers (e.g. cable providers) identify the client's MAC address and require the client to always use the same MAC address to connect to the network. In such cases, change the WAN interface's MAC address to the original client PC's one via this field. The default MAC Address is a unique value assigned at the factory. In most cases, the default value is sufficient. Clicking the Default button restores the MAC Address to the default value.
VLAN	Click the square if you wish to enable VLAN functionality and enable multiple broadcast domains. Once you enable VLAN, you will be able to enter a name for your network.
Reply to ICMP PING	If this field is disabled, the WAN connection will not respond to ICMP PING requests. By default, this is **enabled**.
Additional Public IP Address	The IP Address List represents the list of fixed Internet IP addresses assigned by the ISP, in the event that more than one Internet IP addresses are assigned to this WAN connection. Enter the fixed Internet IP addresses and the corresponding subnet mask, and then click the Down Arrow button to populate IP address entries to the IP Address List.

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IPv6	
IPv6	IPv6 support can be enabled on one of the available Ethernet WAN ports. On this screen, you can choose which WAN will support IPv6. To enable IPv6 support on a WAN, the WAN router must respond to Stateless Address Auto configuration advertisements and DHCPv6 requests. IPv6 clients on the LAN will acquire their IPv6, gateway, and DNS server addresses from it. The device will also acquire an IPv6 address for performing ping/traceroute checks and accepting web admin accesses. Note: This feature is only available on the Pepwave MAX 700,HD2 and HD2 IP67.

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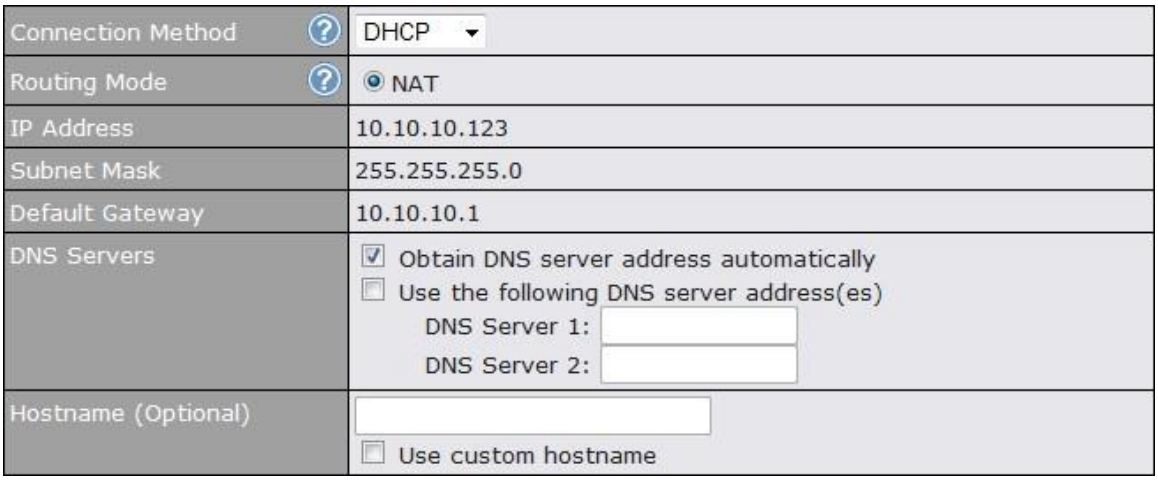
9.1.1 DHCP Connection

The DHCP connection method is suitable if the ISP provides an IP address automatically by DHCP (e.g. Satellite Modem, WiMAX Modem, Cable, Metro Ethernet, etc.).

There are three possible connection methods:

1. DHCP
2. Static IP
3. PPPoE



DHCP Settings	
Routing Mode	This is to substitute the real address in a packet with a mapped address that is routable on the destination network
IP Address/ Subnet Mask/ Default Gateway	This information is obtained from the ISP automatically.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS Servers to be assigned by the WAN DHCP Server to be used for outbound DNS lookups over the connection. (The DNS Servers are obtained along with the WAN IP address assigned from the DHCP server.) When **Use the following DNS server address(es)** is selected, you may enter custom DNS server addresses for this WAN connection into the **DNS Server 1** and **DNS Server 2** fields.
Hostname (Optional)	If your service provider's DHCP server requires you to supply a hostname value upon acquiring an IP address, you may enter the value here. If your service provider does not provide you with the value, you can safely bypass this option.

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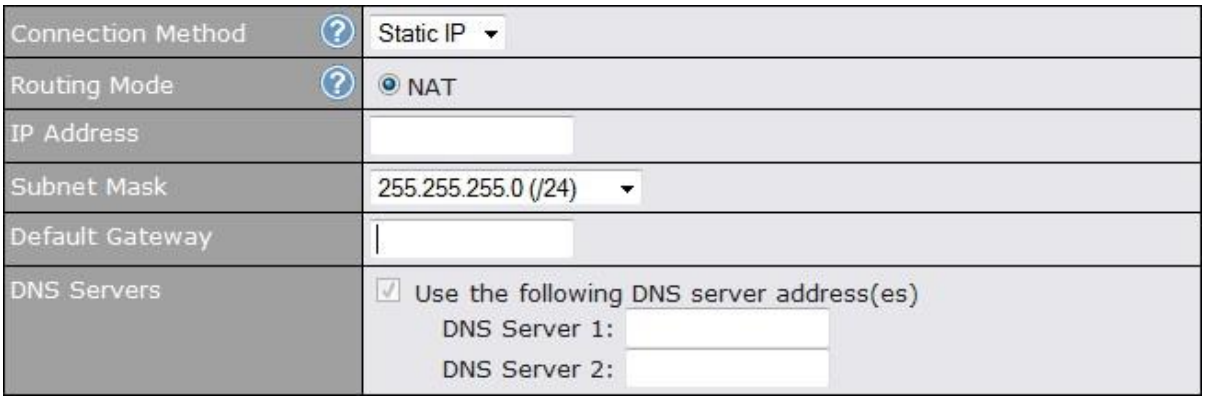
9.1.2 Static IPConnection

This Static IP connection method is suitable if ISP provides a static IP address to connect directly.



Static IP Settings	
Routing Mode	This is to substitute the real address in a packet with a mapped address that is routable on the destination network
IP Address / Subnet Mask / Default Gateway	These settings allow you to specify the information required in order to communicate on the Internet via a fixed Internet IP address. The information is typically determined by and can be obtained from the ISP.
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This field specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. You can input the ISP provided DNS server addresses into the **DNS Server 1** and **DNS Server 2** fields. If no address is entered here, this link will not be used for DNS lookups.

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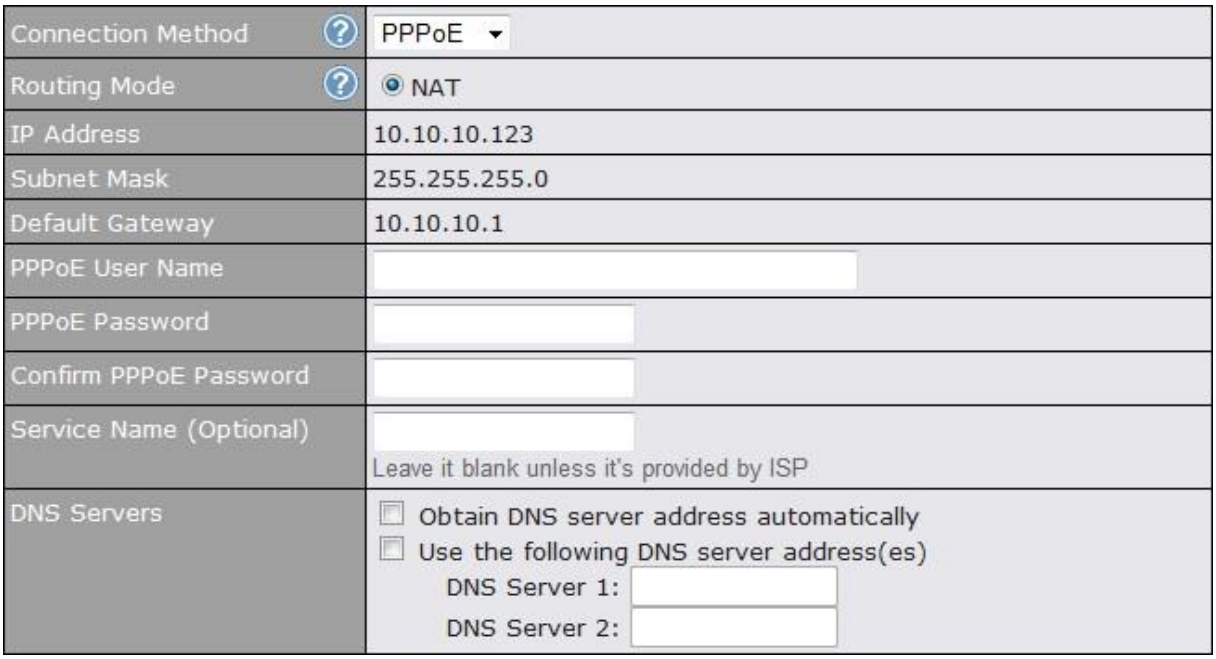
9.1.3 PPPoE Connection

This connection method is suitable if ISP provides login ID/ password to connect via PPPoE.



PPPoE Settings	
Routing Mode	This is to substitute the real address in a packet with a mapped address that is routable on the destination network
IP Address / Subnet Mask / Default Gateway	This information is obtained from the ISP automatically.
PPPoE User Name / Password	Enter the required information in these fields in order to connect via PPPoE to the ISP. The parameter values are determined by and can be obtained from the ISP.
Confirm PPPoE Password	Verify your password by entering it again in this field.
Service Name	Service Name is provided by the ISP. **Note: Leave this field blank unless it is provided by your ISP.**
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups.This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS Servers assigned by the PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS Servers are obtained along with the WAN IP address assigned from the PPPoE server.) When **Use the following DNS server address(es)** is selected, you can put custom DNS server addresses for this WAN connection into the **DNS Server 1 and DNS Server 2** fields.

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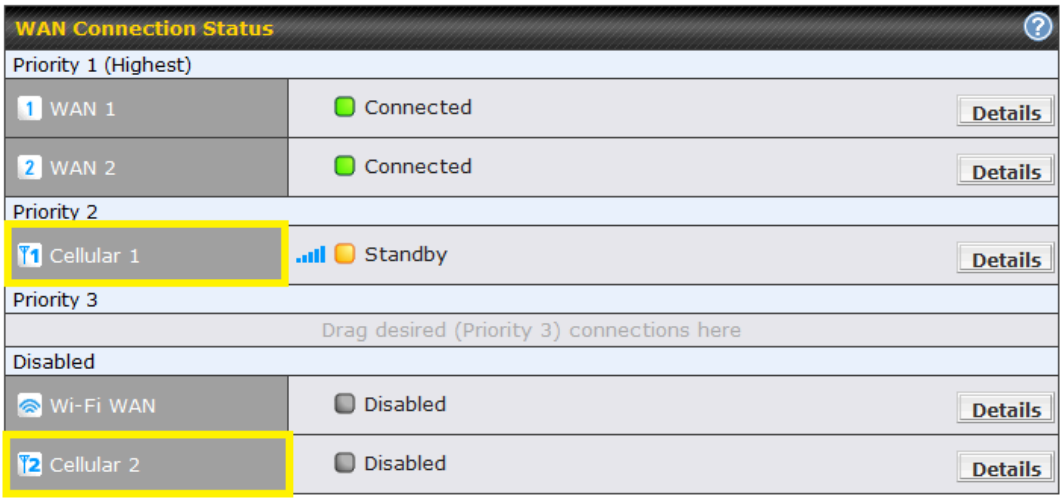
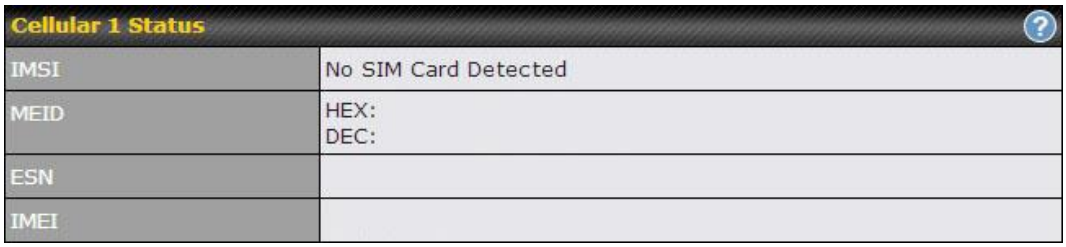
9.2

9.2 Cellular WAN

Network>WAN> Click on Detail Details



(**Available on the Pepwave BR1, MAX HD2, and HD2 IP67 only)**



Cellular Status	
IMSI	This is the International Mobile Subscriber Identity which uniquely identifies the SIM card. This is applicable to 3G modems only.
MEID	The Pepwave MAX supports both HSPA and EV-DO. For Sprint or Verizon Wireless EV-DO users, a unique MEID identifier code (in hexadecimal format) is used by the carrier to associate the EV-DO device with the user. This information is presented in hex and decimal format.
ESN	This serves the same purpose as MEID HEX but uses an older format.
IMEI	This is the unique ID for identifying the modem in GSM/HSPA mode.

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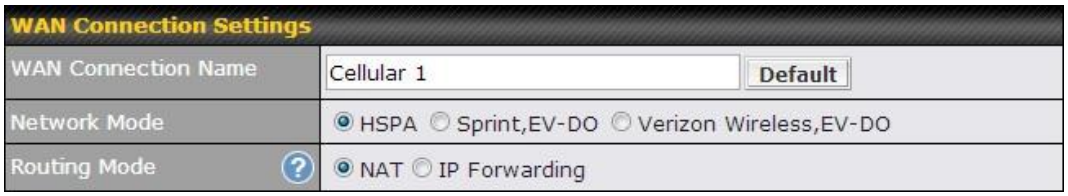
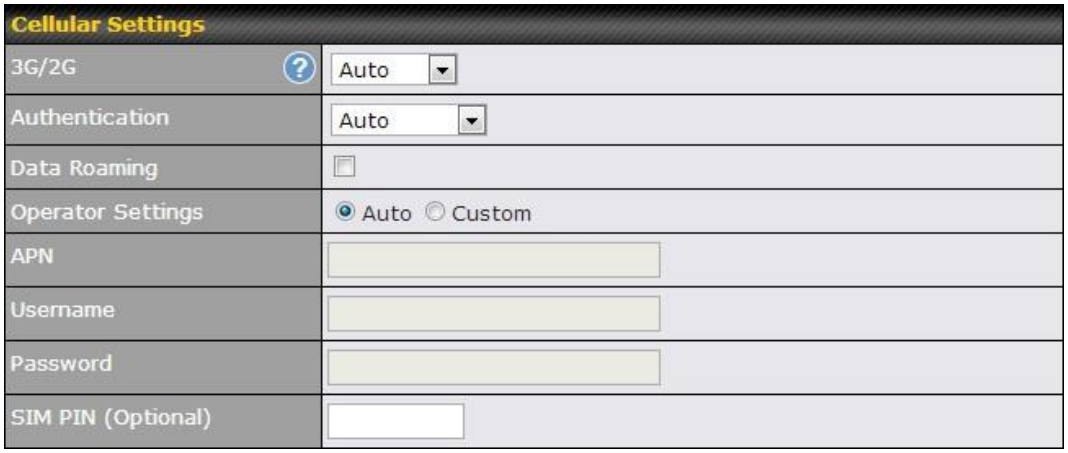


WAN Connection Settings	
WAN Connection Name	This field is for defining a name to represent this WAN connection.
Network Mode	Users have to specify the Network they are on accordingly.
Routing Mode	This option allows you to select the routing method to be used in routing IP frames via the WAN connection. The mode can be either *NAT* (Network Address Translation) or *IP Forwarding*. Click the button to enable IP Forwarding.



Cellular Settings	
3G/2G	Band selection to restrict cellular on particular band. Click on the button to enable the selection of specific bands.
Data Roaming	This checkbox enables data roaming on this particular SIM card. Please check your service provider's data roaming policy before proceeding.
Operator Settings	This setting applies to 3G / EDGE / GPRS modem only. It does not apply to EVDO / EVDO Rev. A modem. This allows you to configure the APN settings of your connection. If **Auto** is selected, the mobile operator should be detected automatically. The connected device will be configured and connection will be made automatically afterwards. If there is any difficulty in making connection, you may select **Custom** to enter your carrier's **APN, Login,**

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	Password, and Dial Number settings manually. The correct values can be obtained from your carrier. The default and recommended Operator Settings is **Auto**.
APN / Login / Password / SIM PIN	When **Auto** is selected, the information in these fields will be filled automatically. Select the option **Custom** and you may customize these parameters. The parameters values are determined by and can be obtained from the ISP.

General Settings	
DNS Servers	Each ISP may provide a set of DNS servers for DNS lookups. This setting specifies the DNS (Domain Name System) Servers to be used when a DNS lookup is routed through this connection. Selecting **Obtain DNS server address automatically** results in the DNS Servers assigned by the PPPoE server to be used for outbound DNS lookups over the WAN connection. (The DNS Servers are obtained along with the WAN IP address assigned from the PPPoE server.) When **Use the following DNS server address(es)** is selected, you can put custom DNS server addresses for this WAN connection into the **DNS Server 1 and DNS Server 2** fields.
Standby State	This option allows you to choose whether to remain the connection connected or disconnected when this WAN connection is no longer in the highest priority and has entered the standby state. When **Remain connected** is chosen, upon bringing up this WAN connection to active, it will be immediately available for use.
Idle Disconnect	When Internet traffic is not detected within the user specified timeframe, the modem will automatically disconnect. Once the traffic is resumed by the LAN host, the connection will be re-activated,

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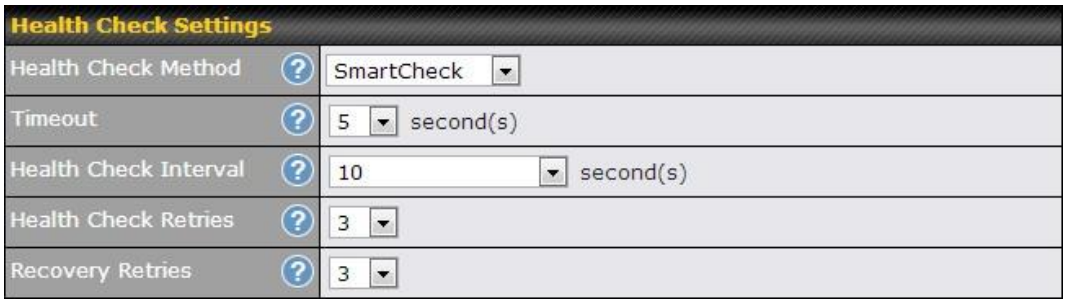

Health Check Settings	
Heath Check Method	This setting allows you to specify the health check method for the Cellular connection. The as available options are **Disabled, Ping, DNS Lookup, HTTP,** and **SmartCheck** The default method is **DNS Lookup**. See Section 9.4 for configuration details.
Timeout	If a health check test cannot be completed within the specified amount of time, the test will be treated as failed.
Health Check Interval	This is the time interval between each health check test.
Health Check Retries	This is the number of consecutive check failures before treating a connection as down.
Recovery Retries	This is the number of responses required after a health check failure before treating a connection as up again.

Dynamic DNS Settings	
Dynamic DNS Service Provider	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature. See Section 1.1 for configuration details.

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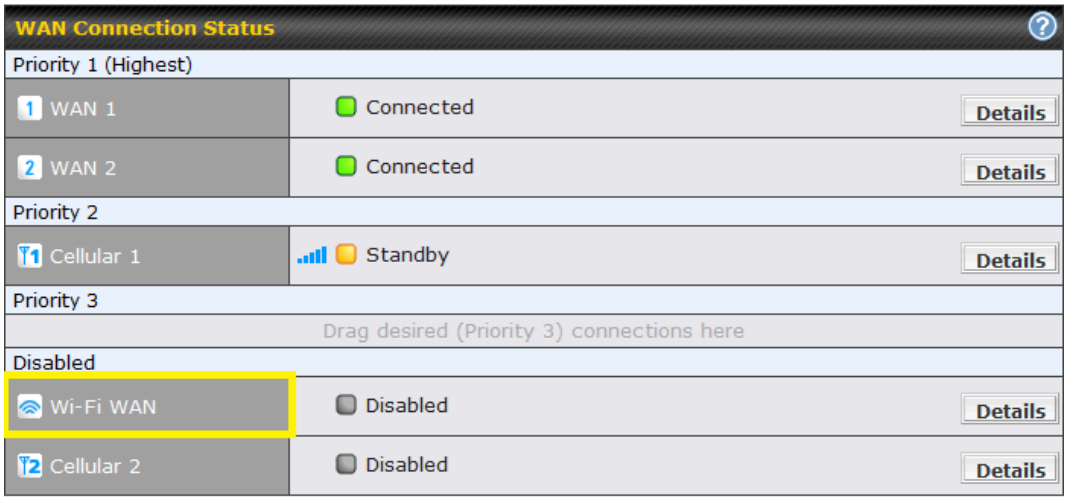
Bandwidth Allowance Settings	
Bandwidth Allowance Monitor	This option allows you to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this is not enabled, bandwidth usage of each month is still being tracked but no action will be taken. See Section 9.5 for configuration details.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the default MTU value. Select **Auto** and the appropriate MTU value will be automatically detected. The auto-detection will run each time when the WAN connection establishes

9.3 Wi-Fi WAN

Network>WAN>Click on Wi-Fi WAN Details



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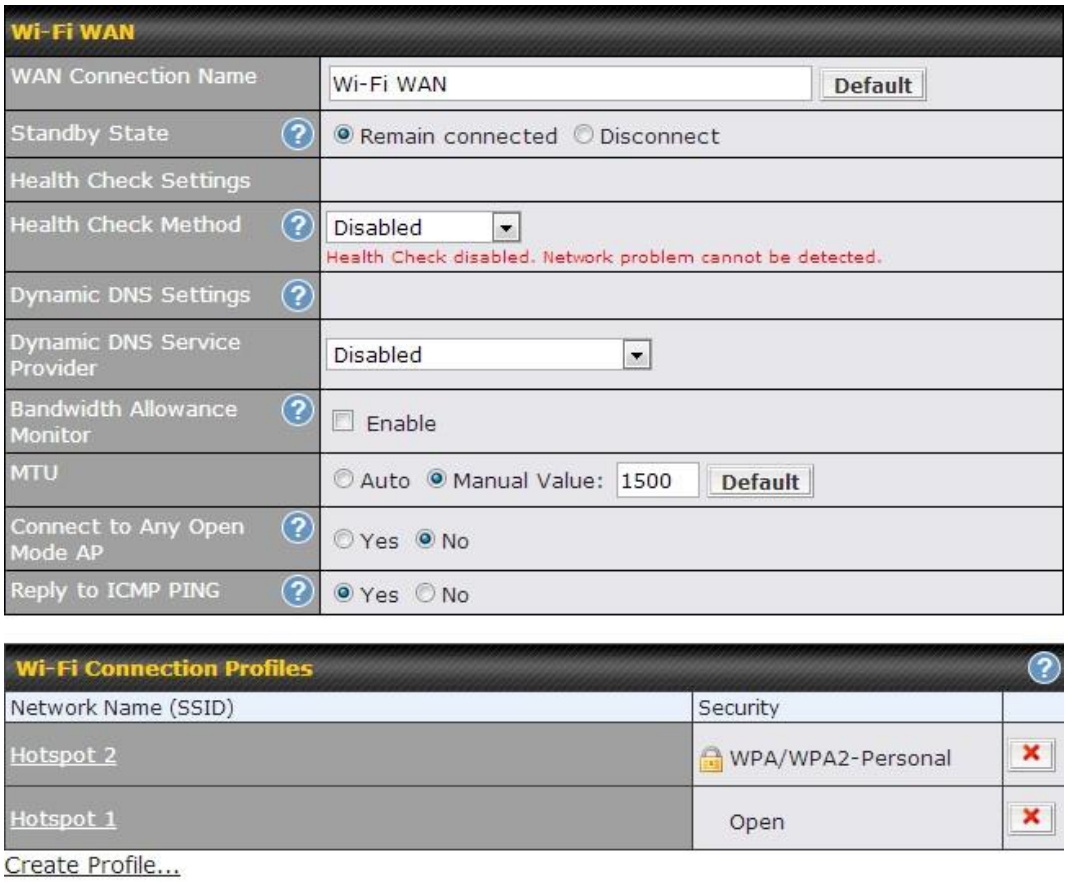

Wi-Fi WAN Settings	
WAN Connection Name	This field is for defining a name to represent this WAN connection.
Standby State	This setting specifies the state of the WAN connection while in standby. The available options are **Remain Connected** (hot standby) and **Disconnect** (cold standby).
Health Check Method	This setting allows you to specify the health check method for the WAN connection. The available options are **Disabled, Ping, and DNS Lookup**. The default method is **Disabled**. See Section 9.4 for configuration details.
Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com

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	• DNS-O-Matic Select Disabled to disable this feature. See Section 1.1 for configuration details.
Bandwidth Allowance Monitor	This option allows you to enable bandwidth usage monitoring on this WAN connection for each billing cycle. When this is not enabled, bandwidth usage of each month is still being tracked but no action will be taken. See Section 9.5 for configuration details.
MTU	This setting specifies the Maximum Transmission Unit. By default, MTU is set to **Custom 1440**. You may adjust the MTU value by editing the text field. Click **Default** to restore the default MTU value. Select **Auto** and the appropriate MTU value will be automatically detected. The auto-detection will run each time when the WAN connection establishes
Connect to Any Open Mode AP	This option is to specify whether the Wi-Fi WAN will connect to any open mode access point it finds. By default, this is **disabled**.
Reply to ICMP PING	If this field is disabled, the WAN connection will not respond to ICMP PING requests. By default, this is **enabled**.

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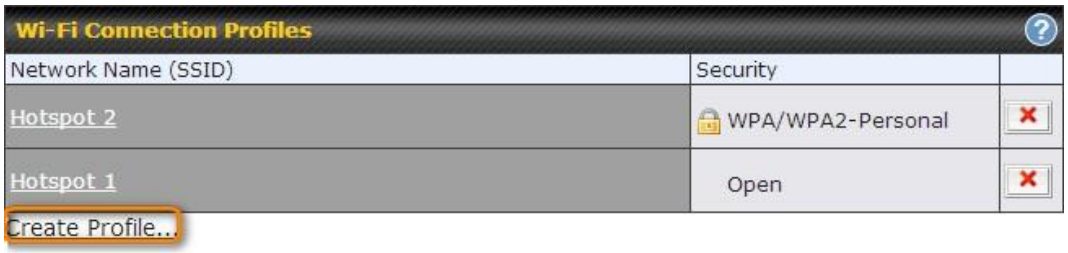
9.3.1 Create Wi-Fi Connection Profile

You can manually create a profile to connect to a Wi-Fi connection. It is useful for creating a profile for connecting to hidden-SSID access points. Click on the link **Create Profile…** and the following window will be displayed.

Network > WAN *click on* Details *and then* click on **Create Profile**….



This will open a window similar to the shown below

Create Wi-Fi Connection Profile Settings	
Network Name (SSID)	This field is for defining a name to represent this Wi-Fi connection.
Security	This option allows you to select which security policy is used for this wireless network. Available options: • **Open** • **WEP** • **WPA/WPA2 – Personal** • **WPA/WPA2 – Enterprise** The settings to be displayed under this row will vary depending on the selected security policy.

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9.4 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, the Pepwave MAX provides the functionality to periodically check the health of each WAN connection.

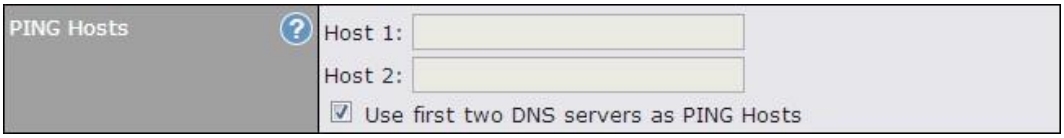
The Health Check settings for each WAN connection can be independently configured via ***Network > WAN > Details***:

Health Check Settings	
Method	This setting specifies the health check method for the WAN connection. The value of Method can be configured as **Disabled**, **Ping** or **DNS Lookup**. The default method is **DNS Lookup**. For Mobile Internet connection, the value of Method can be configured as **Disabled** or **SmartCheck**.

Health Check Disabled

When **Disabled** is chosen in the Method field, the WAN connection will always be considered as up. The connection will not be treated as down in the event of IP routing errors.

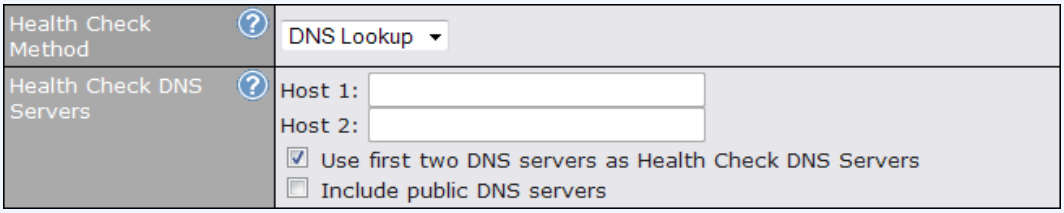
Health Check Method: PING



The ICMP PING packets will be issued to test the connectivity with a configurable target IP address or host name. A WAN connection is considered as up if PING responses are received from either one or both of the PING Hosts.

PING Hosts	This setting specifies IP addresses or host names with which connectivity is to be tested via ICMP Ping. If **Use first two DNS servers as Ping Hosts**is checked, the target PING Host will be the first DNS server for the corresponding WAN connection. Reliable PING hosts with a high uptime should be considered. By default, the first two DNS servers of the WAN connection are used as the PING Hosts.

Health Check Method: DNS Lookup



DNS lookups will be issued to test the connectivity with target DNS servers. The connection will be treated as up if DNS responses are received from either one or both of the servers, regardless of whether the result was positive or

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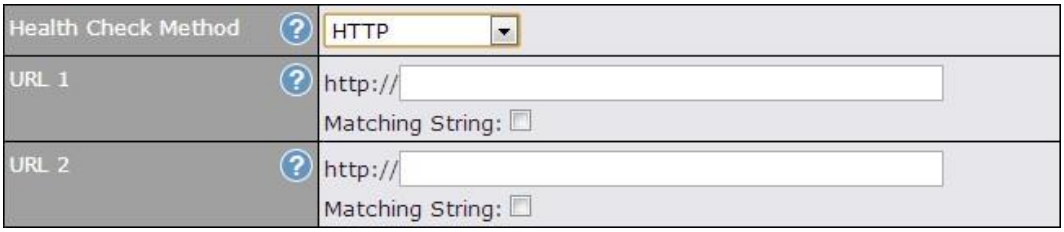
negative.	
Health Check DNS Servers	This field allows you to specify two DNS hosts' IP address with which connectivity is to be tested via DNS Lookup. If **Use first two DNS servers as Health Check DNS Servers**is checked, the first two DNS servers will be the DNS lookup targets for checking a connection's health. If the box is not checked, field Host 1 must be filled and field Host 2 is optional. If the box **Include public DNS servers** is selected and no response is received from all specified DNS servers, DNS lookups will also be issued to some public DNS servers. A WAN connection will be treated as down only if there is also no response received from the public DNS servers. Connections will be considered up if DNS responses are received from any one of the health check DNS servers, regardless of a positive or negative result. By default, the first two DNS servers of the WAN connection are used as the Health Check DNS Servers.
Health Check Method: HTTP	
	
URL 1	HTTP connections will be issued to test the connectivity with configurable URLs and strings to match. ***WAN Settings > WAN Edit > Health Check Settings >URL 1*** The URL will be retrieved when performing an HTTP health check. When *String to Match* is left blank, a health check will pass if the HTTP return code is between 200 and 299 (Note: HTTP redirection codes 301 or 302 are treated as failures). When *String to Match* is filled, a health check will pass if the HTTP return code is between 200 and 299 and if the HTTP response content contains the string
URL 2	***WAN Settings > WAN Edit > Health Check Settings >URL 2*** If URL 2 is also provided, a health check will pass if either one of the tests passed.

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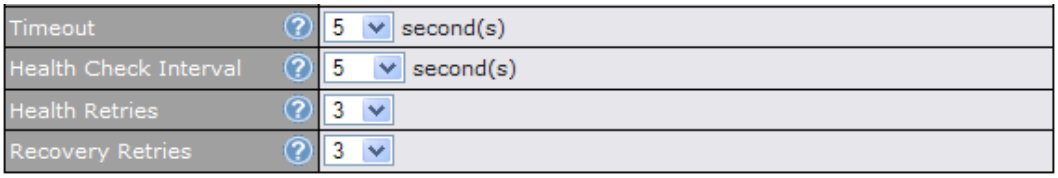
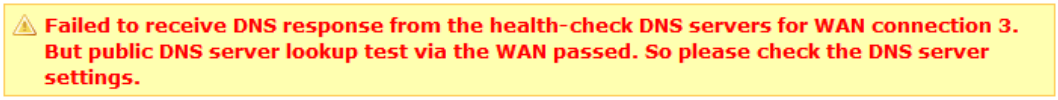
Other Health Check Settings



Timeout	This setting specifies the timeout, in seconds, for ping/DNS lookup requests. Default Timeout is set to **5** second.
Health Check Interval	This setting specifies the time interval, in seconds, between ping or DNS lookup requests. Default Health Check Interval is **5** seconds.
Health Check Retries	This setting specifies the number of consecutive ping/DNS lookup timeouts after which the Pepwave MAX is to treat the corresponding WAN connection as down. Default Health Retries is set to **3**. For example, with the default Health Retries setting of 3, after consecutive 3 timeouts, the corresponding WAN connection will be treated as down.
Recovery Retries	This setting specifies the number of consecutive successful ping/DNS lookup responses that must be received before the Pepwave MAX treats a previously down WAN connection to be up again. By default, Recover Times is set to **3**. For example, a WAN connection that is treated as down will be considered to be up again upon receiving 3 consecutive successful ping/DNS lookup responses.

Automatic Public DNS Server Check on DNS Test Failure

In case the health check method is set to DNS Lookup and checks failed, the MAX will automatically perform DNS lookups on some public DNS servers. If the tests are success, it means the WAN may not be down but rather the target DNS server became malfunctioned. You will see the following warning message on the Main page.


Failed to receive DNS response from the health-check DNS servers for WAN connection 3. But public DNS server lookup test via the WAN passed. So please check the DNS server settings.

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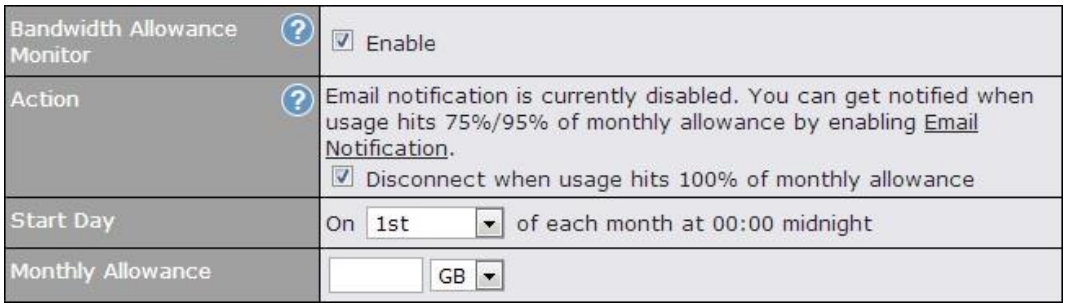
9.5 Bandwidth Allowance Monitor

Bandwidth Allowance Monitor helpskeep track of your network usage. Click **Enable** to begin.


Bandwidth Allowance Monitor
Enable
Action
Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling Email Notification.
Disconnect when usage hits 100% of monthly allowance
Start Day
On 1st of each month at 00:00 midnight
Monthly Allowance
GB

Bandwidth Allowance Monitor	
Action	If the feature Email Notification is enabled, you will be notified through email when usage hits 75% and 95% of the monthly allowance. If the box **Disconnect when usage hits 100% of monthly allowance** is checked, this WAN connection will be disconnected automatically when the usage hits the monthly allowance. It will not resume connection unless this option has been turned off or the usage has been reset when a new billing cycle starts.
Start Day	This option allows you to define which day in the month each billing cycle begins.
Monthly Allowance	This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.

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9.6 Dynamic DNS Settings

The Pepwave MAX is capable of registering the domain name relationships to dynamic DNS service providers. Through registration with dynamic DNS service provider(s), the default public Internet IP address of each WAN connection can be associated with a host name. With Dynamic DNS service enabled for a WAN connection, you can connect to your WAN's IP address from the external even if its IP address is dynamic. You have to register for an account from the listed dynamic DNS service providers before enabling this option.

If the WAN connection's IP address is a reserved private IP address (i.e. behind a NAT router), the Public IP of each WAN will be automatically reported to the DNS service provider.

Either upon a change in IP addresses or every 23 days without link reconnection, the Pepwave MAX will connect to the dynamic DNS service provider to perform an IP address update within the provider's records.

Dynamic DNS Settings	
Dynamic DNS	This setting specifies the dynamic DNS service provider to be used for the WAN based on supported dynamic DNS service providers: • changeip.com • dyndns.org • no-ip.org • tzo.com • DNS-O-Matic Select **Disabled** to disable this feature.
Account Name / Email Address	This setting specifies the registered user name for the dynamic DNS service.
Password / TZO Key	This setting specifies the password for the dynamic DNS service.
Hosts / Domain	This field allows you to specify a list of host names or domains to be associated with the public Internet IP address of the WAN connection. If you need to enter more than one host, you can use a carriage return to separate them.

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Important Note

In order to use dynamic DNS services, appropriate host name registration(s) as well as a valid account with a supported dynamic DNS service provider are required.

A dynamic DNS update is performed whenever a WAN's IP address changes. E.g. IP is changed after a DHCP IP refresh, reconnection, etc.

Due to dynamic DNS service providers' policy; a dynamic DNS host will automatically expire if the host record has not been updated for a long time. Therefore the Pepwave MAX performs an update every 23 days even if a WAN's IP address has not changed.

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10 Advanced Wi-Fi Settings

Wi-Fi settings can be configured at ***Advanced> Wi-Fi Settings***. Please note that menus displayed will vary with model.

Wi-Fi Radio Settings	
Operating Country	This drop-down menu specifies the national / regional regulations which the Wi-Fi Radio should follow. • If a North American region is selected, RF channels 1 to 11 will be available and the maximum transmission power will be 26 dBm (400 mW). • If European region is selected, RF channels 1 to 13 will be available. The maximum transmission power will be 20 dBm (100 mW). NOTE: Users are required to choose an option suitable to local laws and regulations.
Wi-Fi Antenna	This setting determines whether the Wi-Fi radio will use its internal antenna, or rely on an outside one installed on its SMA or Type-N connectors.

Important Note
Per FCC regulation, the country selection is not available on all models marketed in US. All US models are fixed to US channel only.

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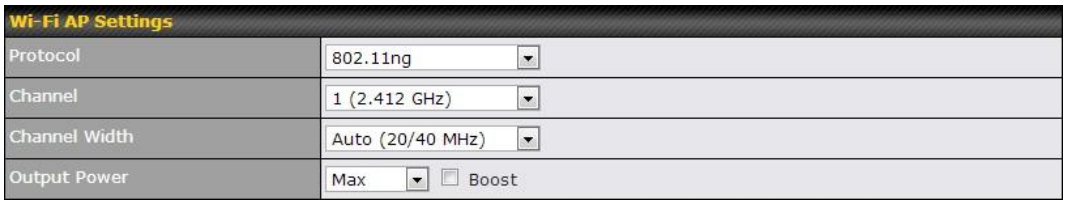
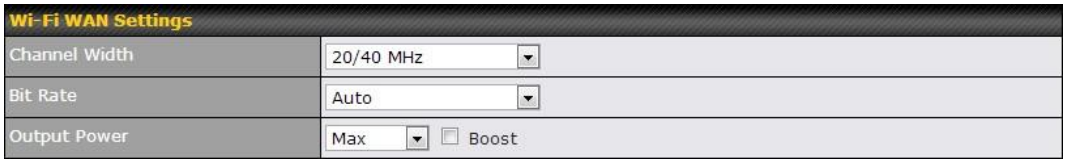


Wi-Fi AP Settings	
Protocol	This option allows you to specify whether 802.11b and/or 802.11g client association requests will be accepted. Available options are **802.11b/g**,**802.11b Only**, and **802.11g Only**. By default, **802.11b/g** is selected.
Channel	This option allows you to select which 802.11 RF channel will be utilized. **Channel 1 (2.412 GHz)** is selected by default.
Channel Width	Options **Auto (20/40 MHz)** and **20 MHz** are available. Default is **Auto (20/40 MHz),** which allows both widths to be used simultaneously.
Output Power	This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – Max, High, Mid and Low. The actual output power will be bound by the regulatory limits of the selected country. By default, **23 dBm (200 mW)** or **20 dBm (100 mW)** (depending on which operating country you have chosen in the previous section) is selected.



Wi-Fi WAN Settings	
Channel Width	Options **Auto (20/40 MHz)** and **20 MHz** are available. Default is **Auto (20/40 MHz),** which allows both widths to be used simultaneously.
Bit Rate	This option allows you to select a specific bit rate for data transfer over the device's Wi-Fi network. By default, **Auto** is selected.
Output Power	This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – Max, High, Mid and Low. The actual output power will be bound by the regulatory limits of the selected country. By default, **23 dBm (200 mW)** or **20 dBm (100 mW)** (depending on which operating country you have chosen in the previous section) is selected.

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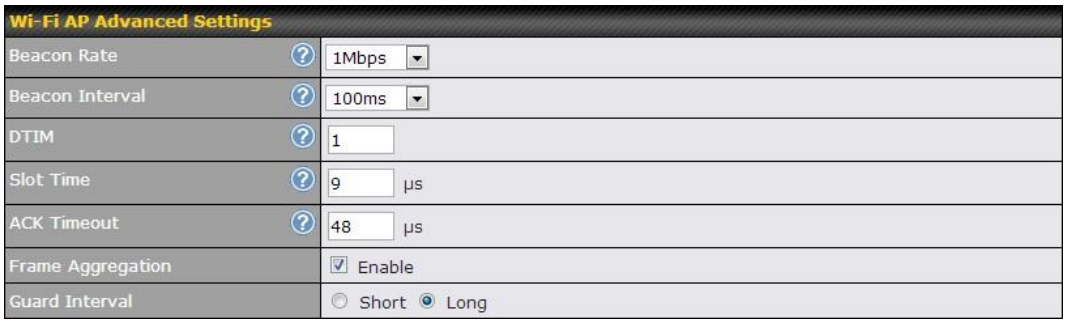

Wi-Fi AP Advanced Settings	
Beacon Rate	This option is for setting the transmit bit rate for sending a beacon. By default, **1Mbps** is selected.
Beacon Interval	This option is for setting the time interval between each beacon. By default, **100ms** is selected.
DTIM	This field allows you to set the frequency for the beacon to include Delivery Traffic Indication Message. The interval is measured in millisecond. The default value is set to **1 ms**.
Slot Time	This field is for specifying the unit wait time before it transmits a packet. By default, this field is set to **9 µs**.
ACK Timeout	This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to **48 µs**.
Frame Aggregation	This option allows you to enable frame aggregation to increase transmission throughput.
Guard Interval	This is where you opt for a short or long guard period interval for your transmissions.

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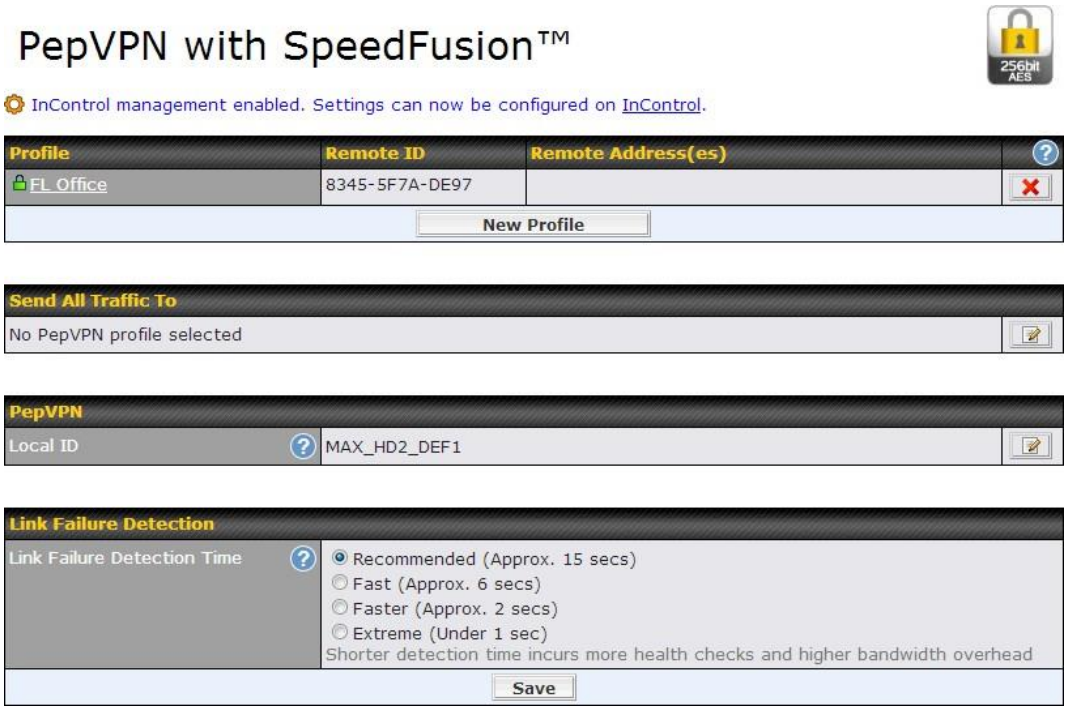
11 Bandwidth Bonding SpeedFusion™

The Pepwave Bandwidth Bonding SpeedFusion™ functionality securely connects your MAX router to another Pepwave MAX or Peplink device (only Peplink Balance 210/310/380/580/710/1350 are available for this function). The data, voice, or video communications between these locations are kept confidential across the public Internet.

The Bandwidth Bonding SpeedFusion™ of the Pepwave MAX is specifically designed for multi-WAN environment. The Pepwave MAX can aggregate all WAN connections' bandwidth for routing SpeedFusion™ traffic. Unless all the WAN connections of one site are down, the Pepwave MAX can still maintain VPN up and running.

VPN Bandwidth Bonding is supported in firmware 5.1 or above. All available bandwidth will be utilized to establish the VPN tunnel, and all traffic will be load balanced at packet level across all links. VPN Bandwidth Bonding is enabled by default.

11.1 PepVPN



The local LAN subnet and subnets behind the LAN (defined under ***Static Route*** in the LAN settings page) will be advertised to the VPN.All VPN members (branch offices and headquarters) will be able to route to the local subnets. Note that all LAN subnet and subnets behind it have to be unique.Otherwise, VPN members will not be able to access each other.

All data can be routed over the VPN with 256-bit AES encryption standard.

To configure, navigate to ***Advanced > PepVPN,*** click the **New Profile** button

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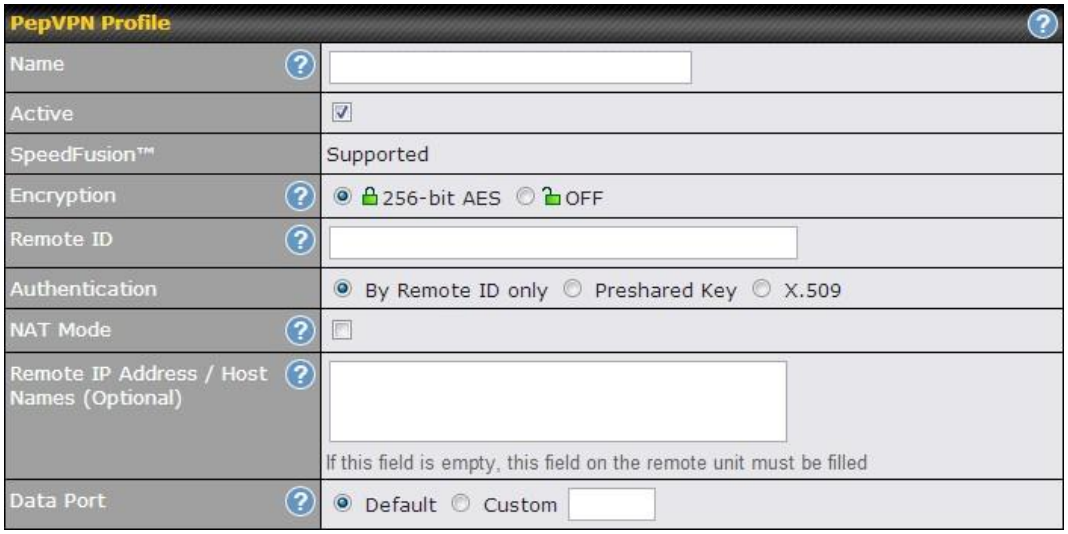
New Profile to create a new VPN profile. Each profile is for making VPN connection with one remote Peplink Balance/Pepwave MAX. Once you click on New Profile button this will open a window:



PepVPN Profile	
Active	Check this box to enable VPN functionality.
Encryption	By default, VPN traffic is encrypted with 256-bit AES standard. If the option Off is selected on both sides of a VPN connection, no encryption will be applied.
Remote ID	The Pepwave MAX establishes VPN connection with a remote peer that has a serial numberor a remote ID here.
Authentication	Select from **By Remote ID Only**, **Preshared Key**, or **X.509** to specify the method the Pepwave MAX will use to authenticate peers. When selecting **By Remote ID Only**, be sure to enter a unique peer ID number in the **Remote ID** field. **Remote ID**: Authentication: By Remote ID only / Preshared Key / X.509 To allow the Pepwave MAX to establish a VPN connection with a specific remote peer using a unique identifying number. **Preshared Key**: Authentication: By Remote ID only / Preshared Key / X.509 Pre-shared Key Hide Characters **Pre-shared Key** defines the pre-shared key used for this particular VPN connection. The connection will be up only if the pre-shared keys on each side match. When the peer is running firmware 5.0+, this setting will be ignored. If you would like to prevent the display of the pre-shared key, check **Hide Characters**.

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	X.509 To authenticate VPN connections using X.509 certificates, copy and paste certificate details into this field. To get more information on a listed X.509 certificate, click the **Show Details** link below the field.
NAT Mode	By selecting this option, the remote unit VPN will be assigned with an IP address from the local DHCP server. All the remote side traffic via this VPN will go through Network Address Translation (NAT) using the assigned IP address.
RemoteIP Addresses / Host Names	Enter the remote peer's WAN IP address(es) or host name(s) here. Dynamic-DNS host names are accepted. This field is optional. With this field filled, the Pepwave MAX will initiate connection to each of the remote IP addresses until success. If the field is empty, the Pepwave MAX will wait for connection from the remote peer. Therefore, at least one side of the two VPN peers has to have the field filled. Otherwise, VPN connection cannot be established. Enter one IP address or host name per line.
Data Port	If **Default** is selected, VPN data will go through UDP port 4500. Select**Custom** and enter a port number if a specific outgoing port is desired.

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Layer 2 Bridging
Bridging Port
LAN
VLAN Tagging
No VLAN
More...
STP
Preserve LAN Settings Upon Connected
After this VPN profile is established, most routing functionalities will cease to work. The device will practically become an Ethernet extender of the remote unit.
Configure
Using DHCP

[A] Layer 2 Bridging is an advanced feature, click the icon next to PepVPN profile to activate it, then click the box next to Layer 2 Bridging to see all configuration options.

Layer 2 Bridging	
Layer 2 Bridging [A]	When this check box is unchecked, traffic between local and remote networks will be IP forwarded. To bridge the Ethernet network of an Ethernet port on a local and remote network, select this check box. When this check box is selected, the two networks will become a single LAN, and any broadcast (e.g., ARP requests) or multicast traffic (e.g., Bonjour) will be sent over the VPN. The L2 bridging feature is hidden from the user interface by default. To enable this feature, user has to click the hidden link at the upper right corner of the SpeedFusion™ Profile table.
Bridge port [A]	This field specifies the port to be bridged to the remote site. If you choose WAN X (internal: replace the X by the WAN port number) that WAN will be disabled for WAN purposes. Instead, the WAN port will be dedicated to bridging with the remote site. The LAN port will remain unchanged.
VLAN Tagging [A]	This field specifies the VLAN ID with which the VPN's traffic should be tagged before sending the traffic to the bridge port. If no VLAN tagging is needed, select No VLAN. To define a new VLAN ID, click New... and input the VLAN ID. VLAN IDs that are not referenced by any VPN profiles will be removed from the list automatically. Default: No VLAN
STP [A]	Checking this box enables Spanning Tree Protocol. Default: Unchecked.
Preserve LAN Settings Upon Connected [A]	The LAN port is chosen as the bridge port. Selecting this option preserves LAN settings (e.g., LAN port IP address, DHCP server, etc.) when the Layer 2 VPN is connected. Uncheck this option if the LAN IP address and gateway will use remote LAN settings. Check this option if the LAN IP address and local DHCP server should remain unchanged after the VPN is up. If you choose not to preserve LAN settings when the VPN is connected, the device will not act as a router, and most Layer 3 routing functions will cease to work.
Configure [A]	Use this setting to specify how a management IP address is acquired for the bridge port in the specified VLAN (if defined) when the Layer 2 bridge is connected. If you choose As None, no IP address will be assigned to the bridge port for the Layer 2 connection.

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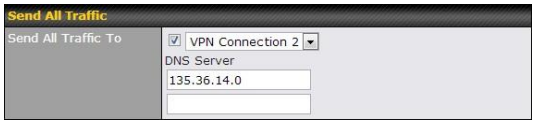
Send All Traffic To

This feature allows you to redirect all traffic to a specified PepVPN connection. Click the button to select your connection and the following menu will appear:



You could also specify a DNS server to resolve incoming DNS requests

PepVPN Local ID

The Local ID is a text string to identify this local unit when establishing a VPN connection. When creating a profile on a remote unit, this Local ID has to be inputted in the remote unit's "Remote ID" field. Click the icon to edit your Local ID.

WAN Connection Priority

WAN Connection Priority	You can specify the priority of the WAN connections to be used for making VPN connections. WAN connections set to **OFF** will never be used. Only available WAN connections with the highest priority will be utilized. To enable connection mapping to remote WAN, click the button.

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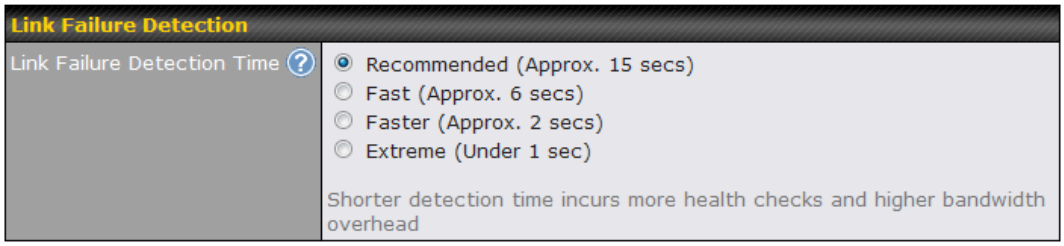

Link Failure Detection
Link Failure Detection Time
Recommended (Approx. 15 secs)
Fast (Approx. 6 secs)
Faster (Approx. 2 secs)
Extreme (Under 1 sec)
Shorter detection time incurs more health checks and higher bandwidth overhead

Link Failure Detection

Link Failure Detection Time

The bonded SpeedFusion™ can detect routing failures on the path between two sites over each WAN connection. Failed WAN connections will not be used to route VPN traffic. Health check packets are sent to the remote unit to detect any failure. The more frequent checks it sends, the shorter detection time, but the higher bandwidth overhead will be consumed.

When **Recommended** is selected, a health check packet is sent out every 5 seconds, and the expected detection time is 15 seconds.

When **Fast** is selected, a health check packet is sent out every 3 seconds, and the expected detection time is 6 seconds.

When **Faster** is selected, a health check packet is sent out every 1 second, and the expected detection time is 2 seconds.

When **Extreme** is selected, a health check packet is sent out every 0.1 second, and the expected detection time is under 1 second.

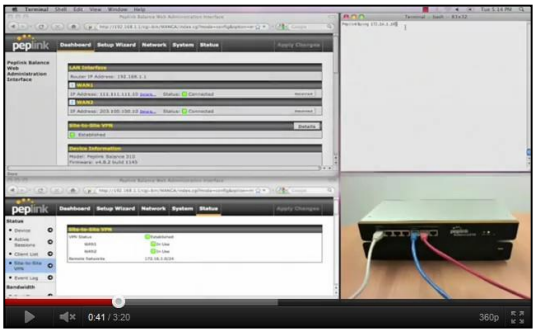
By default, **Recommended** is selected.

Important Note

Pepwave's proprietary SpeedFusion™ used TCP port 32015 and UDP port 4500 for establishing VPN connections. If you have a firewall in front of the devices, you will need to add firewall rules for these port and protocols which will allow inbound and outbound traffic pass-through the firewall.

Tip

Want to know more about VPN Sub-Second Session Failover? Visit our YouTube Channel for a video tutorial!



http://youtu.be/TLQgdpPSY88

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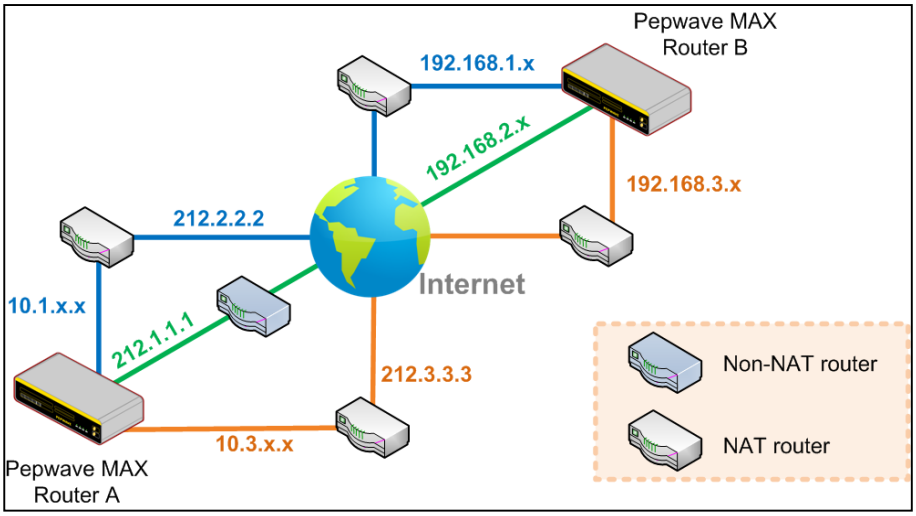
11.2 Pepwave MAX Behind NAT Router

The Pepwave MAX supports establishing SpeedFusion™over WAN connections which are behind a NAT (Network Address Translation) router.

To be able for a WAN connection behind a NAT router to accept VPN connections, you can configure the NAT router in front of the WAN connection to forward TCP port 32015 to it.

If one or more WAN connections on **Unit A** can accept VPN connections (by means of port forwarding or not) while none of the WAN connections on the peer **Unit B** can do so, you should put all public IP addresses or host names of the **Unit A** to the **Unit B**'s **RemoteIP Addresses / Host Names**field. Leave the field in **Unit A** blank.With such setting, SpeedFusion™ connection can be set up and all WAN connections on both sides will be utilized.

For example, see the following diagram:



One of the WANs of RouterA is non-NAT'd (*212.1.1.1*).The rest of the WANs on RouterA and all WANs on RouterB are NAT'd. In such case, the **RemoteIP Addresses / Host Names** field in RouterB should be filled with all of the RouterA's host names or public IP addresses (i.e. *212.1.1.1, 212.2.2.2* and *212.3.3.3*), and the field in RouterA can be left blank. The two NAT routers on WAN1 and WAN3 of Router A should inbound port forward TCP port 32015 to the Router A so that all WANs would be utilized to establish VPN.

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11.3 SpeedFusion™ Status

VPN Status is shown in the ***Status> SpeedFusion™***. The connection status of each connection profile is shown as below:

By clicking the **Details** button at the top-right hand corner of SpeedFusion™table, you will be forwarded to ***Status >SpeedFusion™.*** You can view the subnet and WAN connection information of each VPN peer. Please refer to Section21.5 for details.

IP subnets must be unique among VPN peers

The entire inter-connected SpeedFusion™ network is one single non-NAT IP network. No two subnets in two sites shall be duplicated. Otherwise, connectivity problems will be experienced in accessing those subnets.

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12 IPsec VPN

The Pepwave MAX's IPsec VPN functionality securely connects one or more branch offices to your company's main headquarters or to other branches. The data, voice, or video communications between these locations are thus kept safe and confidential across the public Internet.

The IPsec VPN of the Pepwave MAX is especially designed for a multi-WAN environment. For instance, a user sets up multiple IPsec profiles for his multi- WAN1 ~ WAN3 environment, if WAN1 is connected and its health check turns up good, the IPsec traffic will go through this link. However, should unforeseen problems (e.g. physically unplugged or ISP problems) arise and cause WAN1 to go down, our IPsec implementation will make use of WAN2 and WAN3 accordingly, as failover purposes.

12.1 IPsec VPN Settings

All of our Pepwave products can make multiple IPsec VPN connections with Peplink, Pepwave as well as Cisco or Juniper Routers.

Note that all LAN subnet and subnets behind it have to be unique.Otherwise, VPN members will not be able to access each other.

All data can be routed over the VPN with a selection of encryption standards such as 3DES, AES-128 and AES-256.

To configure, navigate to ***Advanced>IPsec VPN:***

A **NAT-Traversal** option and list of defined**IPsec VPN** profiles will be shown.

The NAT-Traversal option should be enabled if your system is behind a NAT router.

Click the **New Profile** button to create new IPsec VPN profiles that make VPN connections to remote Peplink Balance, Pepwave MAX, Cisco or Juniper Routers via the available WAN connections. To edit any of the profiles, click on its associated connection name in the leftmost column.

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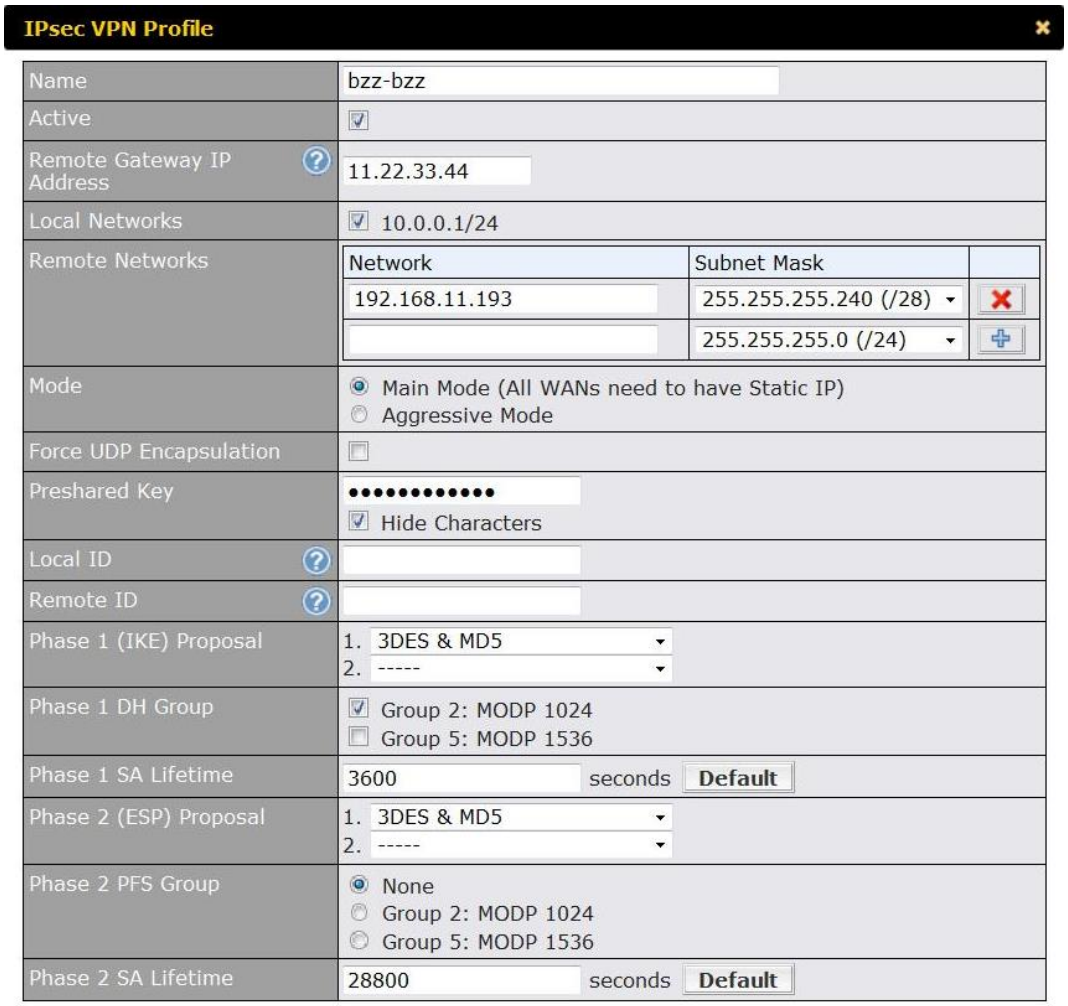

IPsec VPN Settings	
Name	This field is for specifying a local name to represent this connection profile.
Active	When this box is checked, this IPsec VPN connection profile will be enabled. Otherwise, it will be disabled.
Remote Gateway IP Address	Enter the remote peer's public IP address.For Aggressive Mode, this is optional..
Local Networks	Enter the local LAN subnets here. If you have defined "static routes", they will be shown here too.
Remote Networks	Enter the LAN and subnets that are located at the remote site here.
Main Mode	Choose this Main Mode if both IPsec peers use static IP addresses.
Aggressive Mode	Choose this Aggressive Mode if one of the IPsec peers use dynamic IP addresses.
Force UDP Encapsulation	For UDP encapsulation to be forced regardless of the NAT-Traversal, tick this checkbox.
Pre-shared Key	This defines the peer authentication pre-shared key to be used to authenticate this VPN

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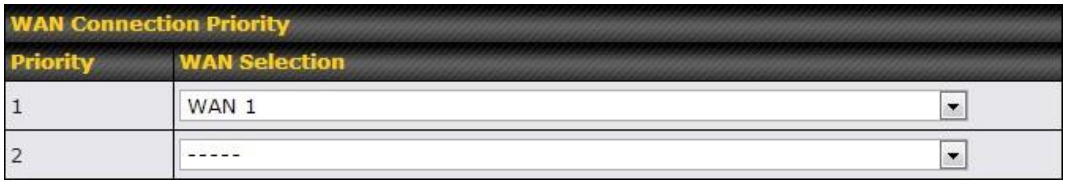
	connection. The connection will be up only if the pre-shared keys on each side match.
Local ID	Under Main Mode, this field can be left blank. Under Aggressive Mode, if Remote Gateway IP Address field is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.
Remote ID	Under Main Mode, this field can be left blank. Under Aggressive Mode, if Remote Gateway IP Address field is filled on this end and the peer end, this field can be left blank. Otherwise, this field is typically a U-FQDN.
Phase 1 (IKE) Proposal	Under Main Mode, this allows the setting of up to 6 encryption standards, in descending order of priority, to be used in the initial connection key negotiations. For Aggressive Mode, only one selection is permitted.
Phase 1 DH Group	This is the Diffie-Hellman group used within IKE. This allows two parties to establish a shared secret over an insecure communications channel. The larger the group number, the higher the security. Group 2 - 1024-bit is the default value. Group 5 - 1536-bit is the alternative option.
Phase 1 SA Lifetime	This setting specifies the lifetime limit of this Phase 1 Security Association. By default, it is set at 3600 seconds.
Phase 2 (ESP) Proposal	Under Main Mode, this allows the setting of up to 6 encryption standards, in descending order of priority, to be used for the IP data that is being transferred. For Aggressive Mode, only one selection is permitted.
Phase 2 PFS Group	The Perfect Forward Secrecy (PFS) ensures that if a key was compromised, the attacker will be able to access only the data protected by that key but not any other data. None - Do not request for PFS when initiating connection. However, since there is no valid reason to refuse PFS, the system will allow the connection to use PFS if requested by the remote peer. This is the default value. Group 2 - 1024-bit Diffie-Hellman group. The larger the group number, the higher the security. Group 5 - 1536-bit is the third option.
Phase 2 SA Lifetime	This setting specifies the lifetime limit of this Phase 2 Security Association. By default, it is set at 28800 seconds.



WAN Connection Priority	
WAN Connection	Select the appropriate WAN connection with the help of drop down

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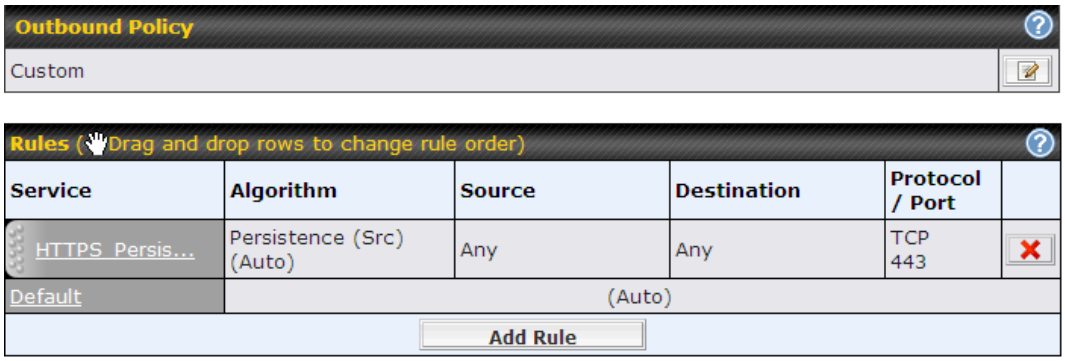
13 Management of Outbound Traffic to WAN

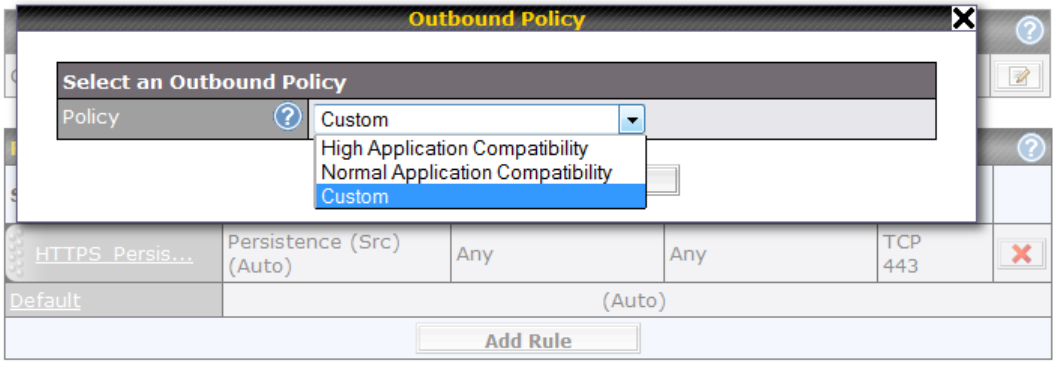
The Pepwave MAX provides the functionality to flexibly manage and load balance outbound traffic among the WAN connections.

Important Note
Outbound Policy is applied only when more than one WAN connection is active.

The settings for managing and load balancing outbound traffic are located in ***Advanced > Outbound Policy***:



Network > Outbound Policy> Click on



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13.1 Outbound Policy

There are three main selections for the Outbound Policy for the Pepwave MAX:

- High Application Compatibility
- Normal Application Compatibility
- Custom

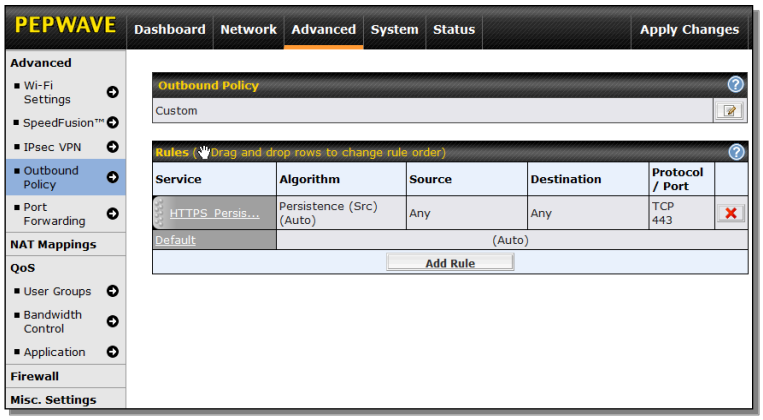
The selections are explained as follows:

Outbound Policy Settings	
High Application Compatibility	With the selection of this policy, outbound traffic from a source LAN device is routed through the same WAN connection regardless of the destination Internet IP address and protocol. This provides the highest application compatibility.
Normal Application Compatibility	With the selection of this policy, outbound traffic from a source LAN device to the same destination Internet IP address will persistently be routed through the same WAN connection regardless of protocol. This provides high compatibility to most applications, and users still benefit from WAN link load balancing when multiple Internet servers are accessed.
Custom	With the selection of this policy, outbound traffic behavior can be managed by defining custom rules. Rules can be defined in a custom rule table. A default rule can be defined for connections that cannot be matched with any one of the rules.

The default policy is **Normal Application Compatibility**.

Tip

Want to know more about how-to create outbound rules? Visit our YouTube Channel for a video tutorial!



http://youtu.be/rKH4AS_bQnE

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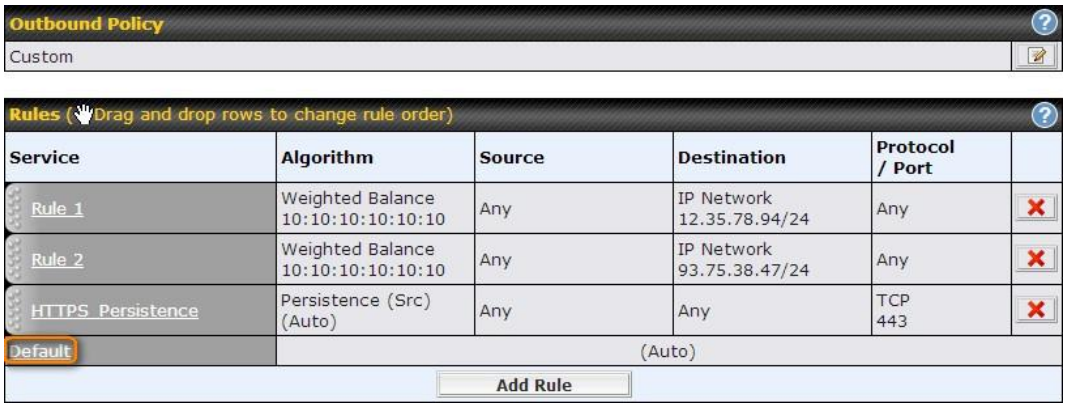
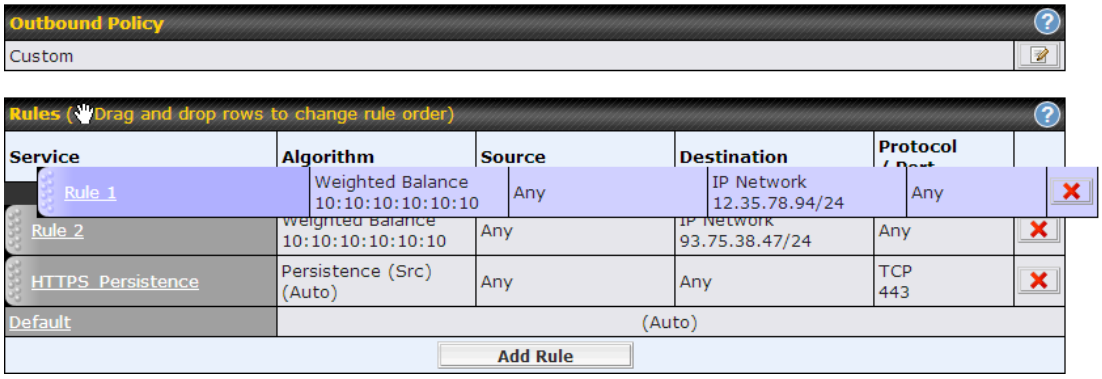
13.2 Custom Rules For Outbound Policy

Click in the Outbound Policy form. Choose **Managed by Custom Rules** and press the **Save** button. The followingscreen will then be displayed.

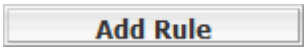
The bottom-most rule is **Default**. Edit this rule to change the device's default way to control outbound traffic for all connections that does not match any rules above it. Click on the service name **Default** to change its settings.



You may drag and drop a row to rearrange the priority of outbound rules.



By default, **Auto** is selected for the option **Default Rule**. You can select **Custom** in order to change the Algorithm to be used.Please refer to the upcoming sections for the details of the available algorithms.

To create a custom rule, click **Add Rule**  at the bottom of the table, and the following window will be displayed:

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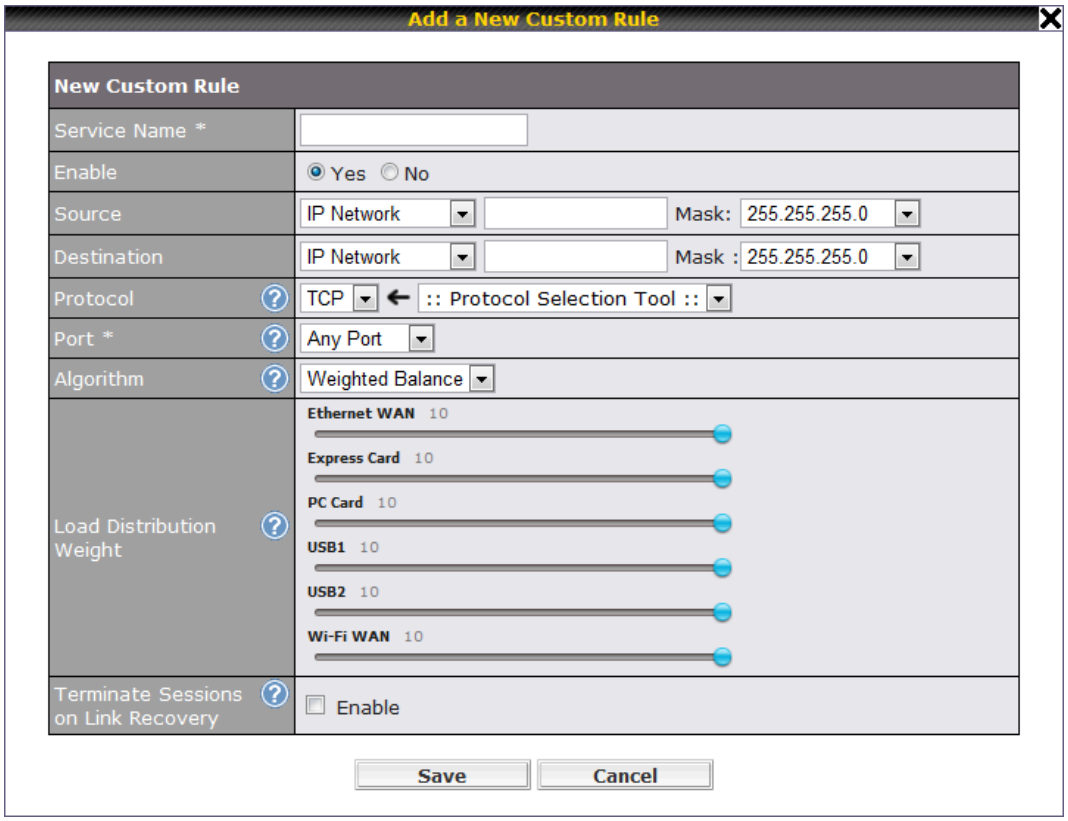
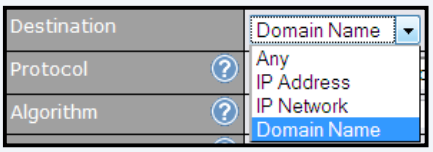


New Custom Rule Settings	
Service Name	This setting specifies the name of the custom rule.
Enable	This setting specifies whether the outbound traffic rule takes effect. With an Enable value of **Yes**, the rule takes effect: traffic is matched, and actions are taken, by the Pepwave MAX based on the other parameters of the rule. With an Enable value of **No**, the rule does not take effect and the Pepwave MAX will disregard the other parameters of the rule.
Source	This setting specifies the source IP Address, IP Network or MAC Address for outbound traffic that matches the rule.
Destination	This setting specifies the destination IP Address or IP Network or Domain Name for traffic that matches the rule. 
Domain Name	If Domain Name is chosen and a domain name, such as foobar.com, is entered, any outgoing accesses to foobar.com and `*.foobar.com`will match this criterion. You may enter a wildcard (.*) at the end of a domain name to match any host with a name having the domain name in the middle. If you enter `.*`, for example, then www.foobar.com, www.foobar.co.jp, or foobar.co.uk will also match. Placing wildcards in any other position is not supported.

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	NOTE: if a server has one Internet IP address and multiple server names, and if one of the names is defined here, then accesses to any one of the server names will also match this rule.
Protocol and Port	This setting specifies the IP Protocol and Port of outbound traffic that matches this rule. You may select some common protocol from the **Protocol Selection Tool** drop-down menu.
Algorithm	This setting specifies the behavior of the Pepwave MAX for the custom rule. One of the following values can be selected: • Weighted Balance • Persistence • Enforced • Priority • Overflow • Least Used • Lowest Latency The upcoming sections present the details of the listed algorithms.
Terminate Sessions on Link Recovery	This setting specifies whether to terminate existing IP sessions on a less preferred WAN connection in the event that a more preferred WAN connection is recovered. This setting is applicable to the Algorithms: **Weighted**, **Persistence** and **Priority**. By default, this is disabled. In this case, all existing IP sessions will not be terminated or affected when any other WAN connection is recovered. If it is set to enabled, existing IP sessions may be terminated when another WAN connection is recovered such that only the preferred healthy WAN connection(s) are used at any point in time.

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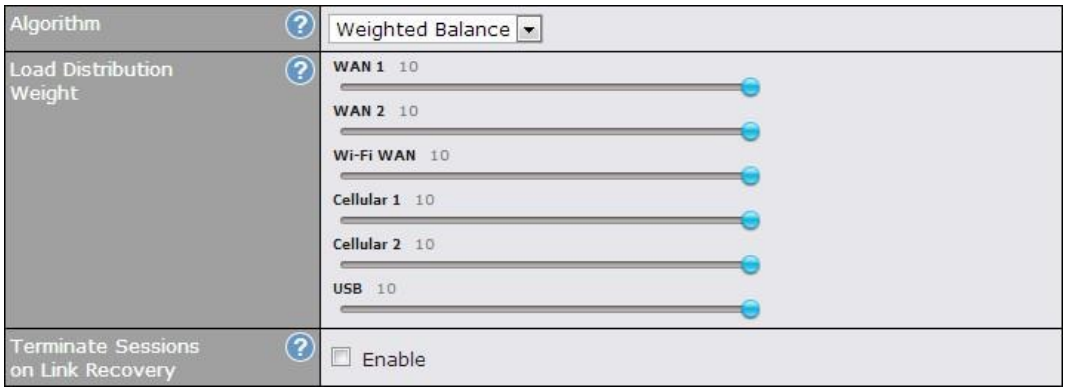
13.2.1 Algorithm: Weighted Balance

This setting specifies the ratio of WAN connection usage to be applied on the specified IP Protocol & Port, and is applicable only when Algorithm is set to **Weighted Balance**.



The amount of matching traffic that is distributed to a WAN connection is proportional to the weight of the WAN connection relative to the total weight. Use the sliders to change the weight for each WAN.

Example: With the following weight settings:

- Ethernet WAN1: 10
- Ethernet WAN2: 10
- Wi-Fi WAN: 10
- Cellular 1: 10
- Cellular 2: 10
- USB: 10

Total weight is 60 = (10 +10 + 10 + 10 + 10 + 10)

Matching traffic distributed to Ethernet WAN1 is 16.7% = (10 / 60 x 100%

Matching traffic distributed to Ethernet WAN2 is 16.7% = (10 / 60) x 100%

Matching traffic distributed to Wi-Fi WAN is 16.7% = (10 / 60) x 100%

Matching traffic distributed to Cellular 1 is 16.7% = (10 / 60) x 100%

Matching traffic distributed to Cellular 2 is 16.7% = (10 / 60) x 100%

Matching traffic distributed to USB is 16.7% = (10 / 60) x 100%

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13.2.2 Algorithm: Persistence

The Persistence algorithm is the solution to the few situations where link load distribution for Internet services is undesirable.

For example,many e-banking and other secure websites, for security reasons, terminate the session when the client computer's Internet IP address changes during the session.

In general, different Internet IP addresses represent different computers. The security concern is that an IP address change during a session may be the result of an unauthorized intrusion attempt. Therefore, to prevent damages from the potential intrusion, the session is terminated upon the detection of an IP address change.

The Pepwave MAX can be configured to distribute data traffic across multiple WAN connections. Also, the Internet IP depends on the WAN connections over which communication actually takes place. As a result, a LAN client computer behind the Pepwave MAX may communicate using multiple Internet IP addresses. For example, a LAN client computer behind a Pepwave MAX with three WAN connections may communicate on the Internet using three different IP addresses.

With the algorithm Persistence of the Pepwave MAX, rules can be configured to enable client computers to persistently utilize the same WAN connections for e-banking and other secure websites. As a result, a client computer will communicate with the other end using one IP address and eliminate the issues.

There are two modes for Persistence: **By Source** and **By Destination**.

By Source	The same WAN connection will be used for traffic matching the rule and originating from the same machine regardless of its destination. This option will provide the highest level of application compatibility.
By Destination	The same WAN connection will be used for traffic matching the rule, originating from the same machine, and going to the same destination. This option can better distribute load to WAN connections when there are only a few client machines.

The default mode is **By Source**.

When there are multiple client requests, they can be distributed (persistently) to WAN connections with a weight. If you choose **Auto** for **Load Distribution**, the weights will be automatically adjusted according to each WAN's Downstream Bandwidth which is specified in the WAN settings page (see Section 8.2Captive Portal

The Captive Portal serves as gateway that clients have to pass if they wish to access the internet using your router. To configure, navigate to **Network > Captive Portal** to see the following screen:

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Captive Portal Settings

Apply On

Clicking the **edit** button trigger a dialogue where you can choose which LAN / VLAN to apply your captive portal.

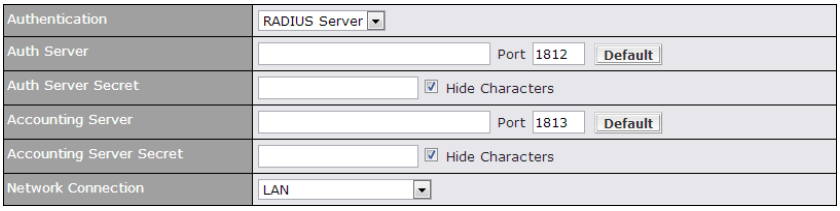
Click all LAN / VLAN that you wish to apply the captive portal to.

Access Mode

Click **Open Access** to allow clients to freely access your router. Click **User Authentication** to force your clients to authenticate before accessing your router.

Radius Server

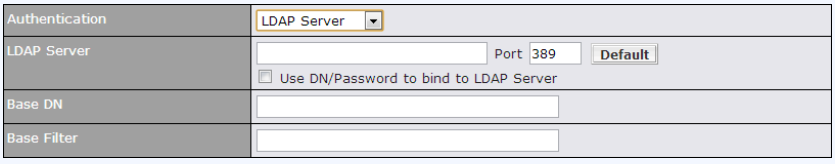
This authenticates your clients through a Radius Server. Upon selecting this option, you will see the following fields:



Fill in the necessary information to complete your connection to the server and enable authentication.

LDAP Server

This authenticates your clients through a LDAP Server. Upon selecting this option, you will see the following fields:



Fill in the necessary information to complete your connection to the server and enable authentication.

Access Quota

Set a time and data cap to each user's Internet usage.

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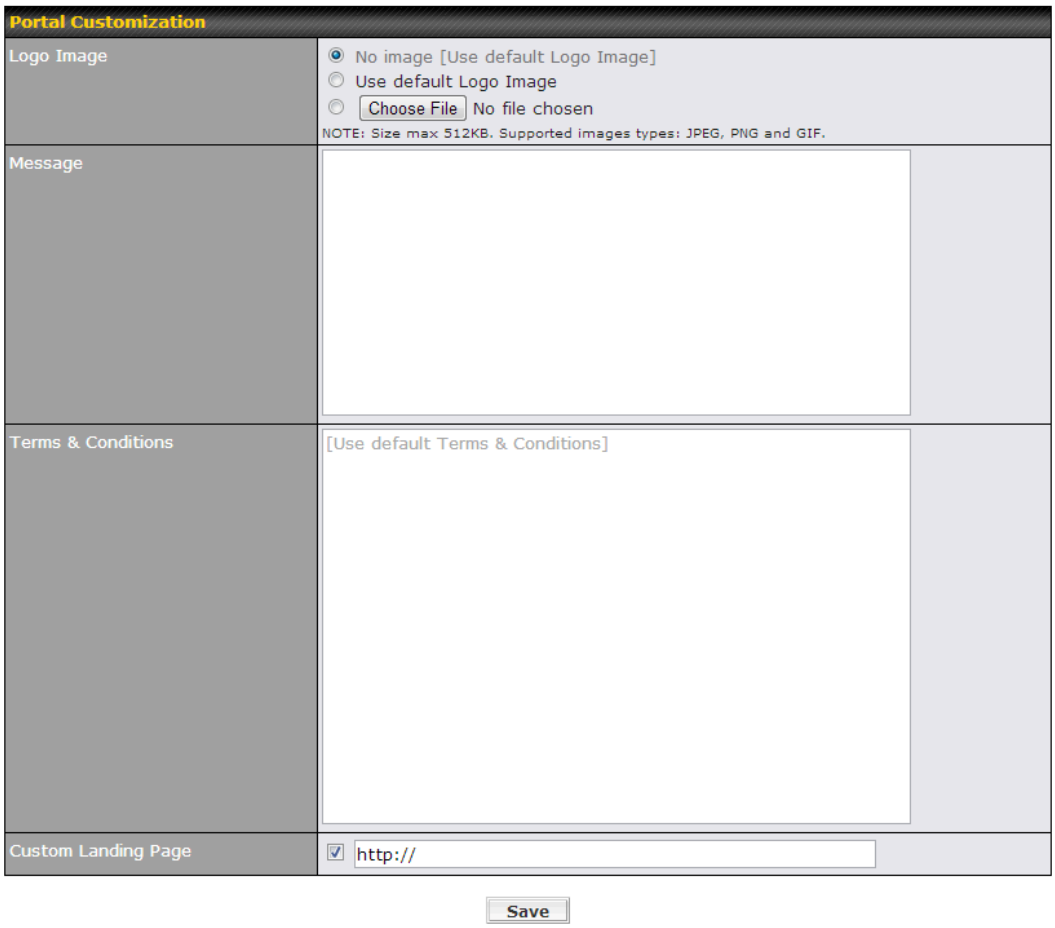
Quota Reset Time	This menu determines how your usage quota resets. Setting it to **daily** will reset it at a specified time every day. Setting a number of **minutes after quota reached** establish a timer for each user that begins after the quota has been reached.
Splash Page	Here, you can choose between using the MAX router's built-in captive portal and redirecting clients to a URL you define.

The Portal Customization menu has two options: Preview and . Clicking will result in a pop-up previewing the captive portal that your clients will see. Clicking will result in the appearance of following menu:



Portal Customization	
Logo Image	Click the **Choose File** button to select an logo to use for the built-in portal

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Message	If you have any additional messages for your users, place it on this field.
Terms & Conditions	If you would like to use your own set of terms and conditions, please place it here. If left empty, the built-in portal will display the default terms and conditions.
Custom Landing Page	Fill in this field to redirect clients to an external URL.

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14 Configuration of WAN Interface(s)

). If you choose **Custom**, you can customize the weight of each WAN manually by using the sliders.

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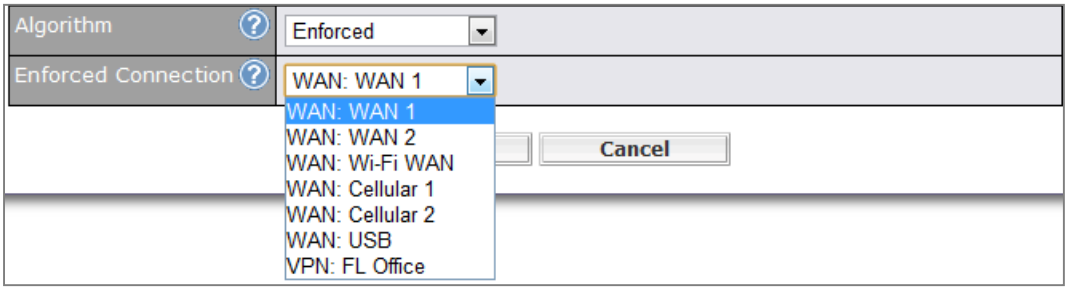
14.1.1 Algorithm: Enforced

This setting specifies the WAN connection usage to be applied on the specified IP Protocol & Port, and is applicable only when theAlgorithm is set to **Enforced**.

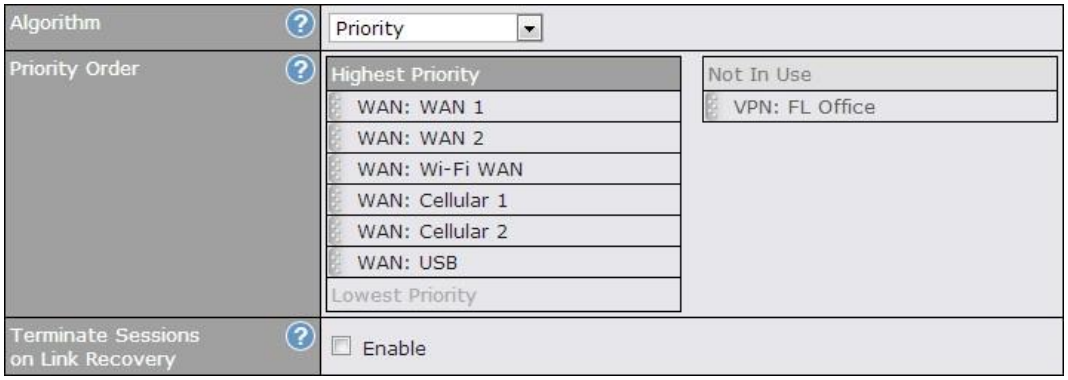


Matching traffic will be routed through the specified WAN connection regardless of the connection's health check status.

Starting from firmware 5.2, outbound traffic can be enforced to go through a specified SpeedFusion™ connection.

14.1.2 Algorithm: Priority

This setting specifies the priority of the WAN connections to be utilized to route the specified network service. The highest priority WAN connectionavailable will always be used for routing the specified type of traffic. A lower priority WAN connection will be used only when all higher priority connections have become unavailable.



Starting from firmware 5.2, outbound traffic can be prioritized to go through SpeedFusion™connection(s). By default, VPN connections are not included in the priority list.

Tip
Configure multiple distribution rules to accommodate different kinds of services.

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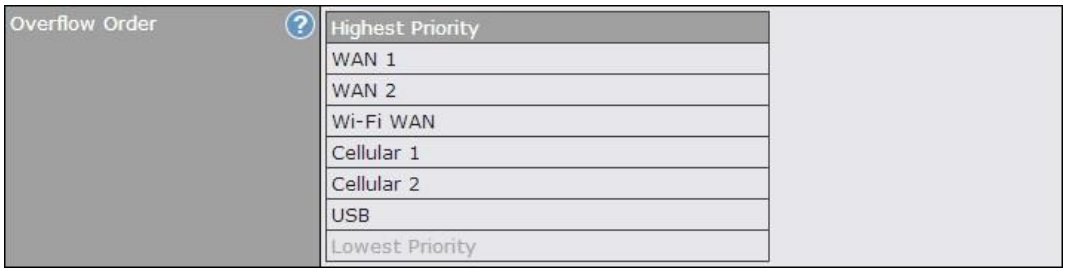
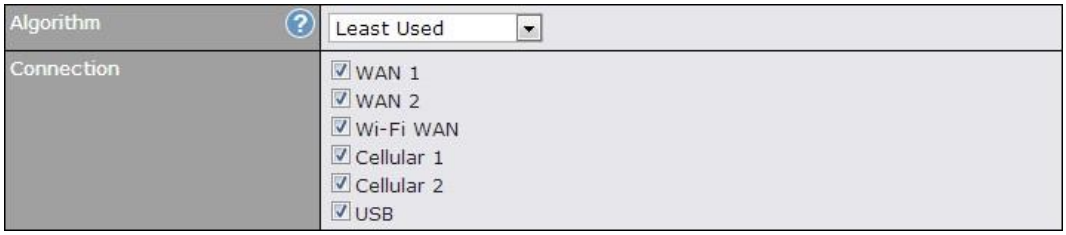
14.1.3 Algorithm: Overflow

The traffic matching this rule will be routed through the healthy WAN connection that has the highest priority and is not in full load. When this connection gets saturated, new sessions will be routed to the next healthy WAN connection that is not in full load.



Drag and drop to specify the order of WAN connections to be used for routing traffic. Only the highest priority healthy connection that is not in full load will be utilized.

14.1.4 Algorithm: Least Used



The traffic matching this rule will be routed through the healthy WAN connection that is selected in the field **Connection** and has the most available downstreambandwidth. The available downstream bandwidth of a WAN connection is calculated from the total downstream bandwidth specified in the WAN settings page and the current downstream usage. The available bandwidth and WAN selection is determined every time when an IP session is made.

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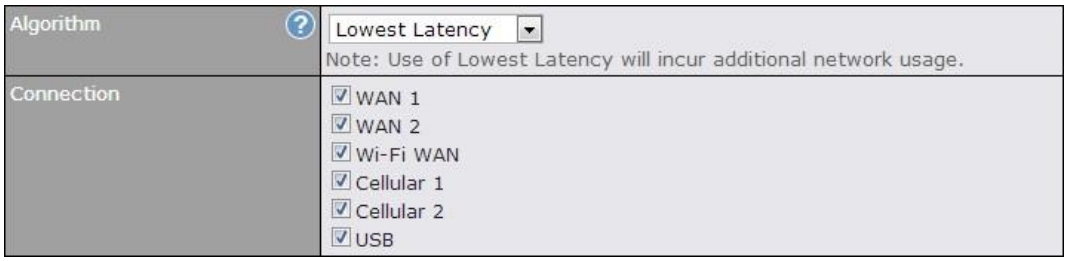
14.1.5 Algorithm: Lowest Latency



The traffic matching this rule will be routed through the healthy WAN connection that is selected in the field *Connection* and has the lowest latency. Latency checking packets are issued periodically to a nearby router of each WAN connection to determine its latency value. The latency of a WAN is the packet round trip time of the WAN connection. Additional network usage may be incurred as a result.

Tip

The round trip time of a "6M down / 640k up" link can be higher than that of a "2M down / 2M up" link. It is because the overall round trip time is lengthened by its lower upstream bandwidth despite of its higher downlink speed. Therefore this algorithm is good for two scenarios:

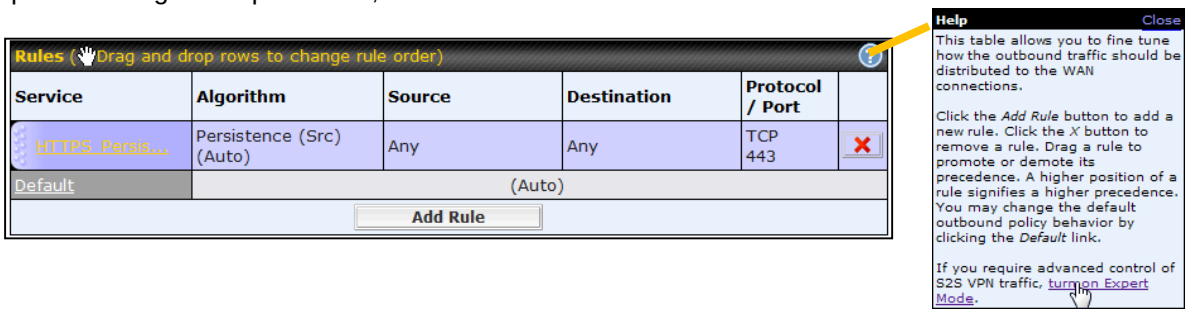
- All WAN connections are symmetric; or
- A latency sensitive application requires to be routed through the lowest latency WAN regardless the WAN's available bandwidth.

14.1.6 Expert Mode

Expert Mode is also available for advance users. Click the help test balloon and click the link turn on Expert Mode to switch on the feature.

Under Expert Mode, a special rule - "SpeedFusion™Routes" is displayed on the Custom Rules table. It represents all SpeedFusion™routes learned from remote VPN peers. By default, this bar is on the top of all custom rules. That means traffic for remote VPN subnets will be routed to its corresponding VPN peer. You can create custom Priority or Enforced rules and move them above the bar to override the SpeedFusion™Routes.

Upon disabling the Expert Mode, all rules above the bar will be deleted.


Rules (Drag and drop rows to change rule order)
Service
Algorithm
Source
Destination
Protocol / Port
HTTPS Persis...
Persistence (Src) (Auto)
Any
Any
TCP 443
Default
(Auto)
Add Rule
Help
Close
This table allows you to fine tune how the outbound traffic should be distributed to the WAN connections.
Click the Add Rule button to add a new rule. Click the X button to remove a rule. Drag a rule to promote or demote its precedence. A higher position of a rule signifies a higher precedence. You may change the default outbound policy behavior by clicking the Default link.
If you require advanced control of S2S VPN traffic, turn on Expert Mode.

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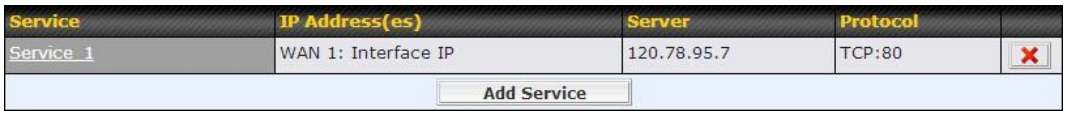
15 Port Forwarding

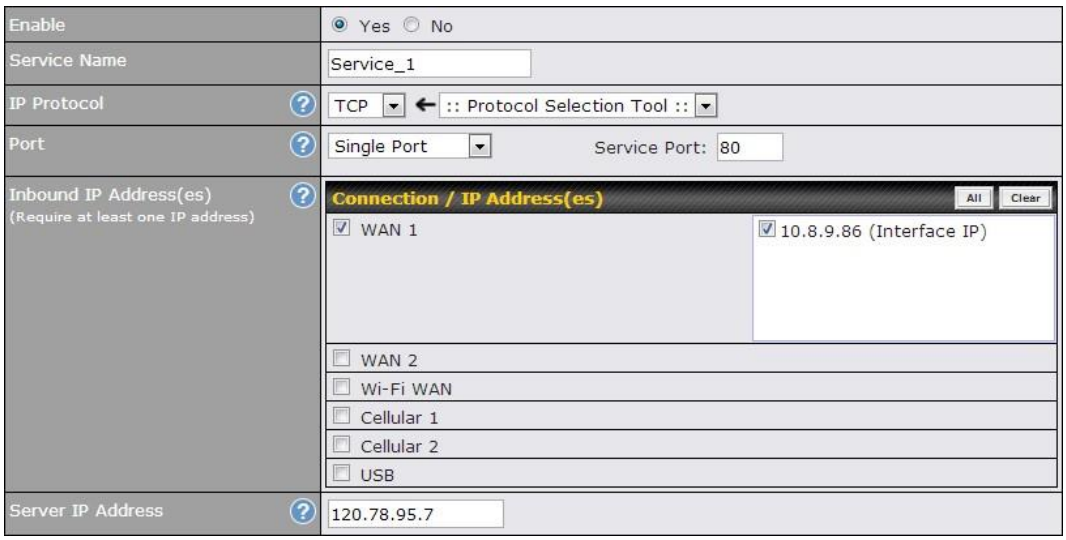
15.1 Port Forwarding Service

The Pepwave MAX can act as a firewall that blocks, by default, all inbound access from the Internet. By using **Port Forwarding**, Internet users can access the servers behind Pepwave MAX.

Inbound Port Forwarding rules can be defined at ***Advanced>Port Forwarding***:



To define a new service, click the **Add Service**button, upon which the following appears:



Port Forwarding Settings	
Enable	This setting specifies whether the inbound service rule takes effect. When **Yes** is selected, the inbound service rule takes effect. If the inbound traffic matches the specified IP Protocol and Port, action will be taken by the Pepwave MAX based on the other parameters of the rule. When **No** is selected, the inbound service rule does not take effect. The Pepwave MAX will disregard the other parameters of the rule.
Service Name	This setting identifies the service to the System Administrator. Valid values for this setting consist only of alphanumeric and the underscore "_" characters.
IP Protocol	The IP Protocol setting, along with the Port setting, specifies the protocol of the service as TCP, UDP, ICMP or IP. Traffic that is received by the Pepwave MAX via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the Servers setting. (Please see below for details on the Port and Servers settings.) Alternatively, the **Protocol Selection Tool** drop-down menu can be used toautomatically

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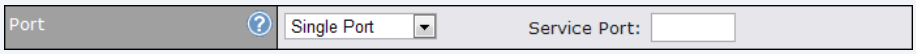
	fill in the Protocol and a single Port number of common Internet services (e.g. HTTP, HTTPS, etc.). After selecting an item from the Protocol Selection Tool drop-down menu, the Protocol and Port number remains manually modifiable.
Port	The Port setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: **Any Port, Single Port, Port Range and Port Map** Any Port: All traffic that is received by the Pepwave MAX via the specified protocol is forwarded to the servers specified by the Servers setting. For example, with IP Protocol set to TCP, and Port set to Any Port, all TCP traffic is forwarded to the configured servers.  **Single Port**: Traffic that is received by the Pepwave MAX via the specified protocol at the specified port is forwarded via the same port to the servers specified by the Servers setting. For example, with IP Protocol set to **TCP**, and Port set to **Single Port** and **Service Port 80**, TCP traffic received on Port 80 is forwarded to the configured servers via Port 80. **Port Range**: Traffic that is received by the Pepwave MAX via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the Servers setting. For example, with IP Protocol set to **TCP**, and Port set to **Single Port** and **Service Port 80-88**, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports. **Port Mapping**: Traffic that is received by the Pepwave MAX via the specified protocol at the specified port is forwarded via a different port to the servers specified by the Servers setting. For example, with IP Protocol set to **TCP**, and Port set to **Port Map**, **Service Port 80**, and **Map to Port 88**, TCP traffic on Port 80 is forwarded to the configured servers via Port 88. (Please see below for details on the Servers setting.) **Range Mapping**: traffic that is received by the Pepwave MAX via the specified protocol at the specified port range is forwarded via a different port to the servers specified by the Servers setting.
Inbound IP Address(es)	This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed. It is required to select at least one IP address.
Server IP Address	This setting specifies the LAN IP address of the server that handles the requests for the service.

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15.1.1 UPnP / NAT-PMP Settings

UPnP and NAT-PMP are network protocols which allow a computer on the LAN to automatically configure the router to allow parties on the WAN to connect to itself.In this way, the process of inbound port forwarding is automated.

When a computer creates a rule using these protocols, the specified TCP/UDP port of all WAN connections' default IP address will be forwarded.

Check the corresponding box(es) to enable UPnP and/or NAT-PMP. Enable these features only if you trust the computers on the LAN.

A table listing all the forwarded ports under these two protocols can be found at ***Status > UPnP / NAT-PMP***.

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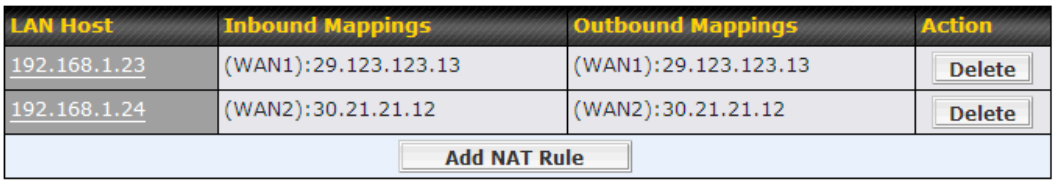
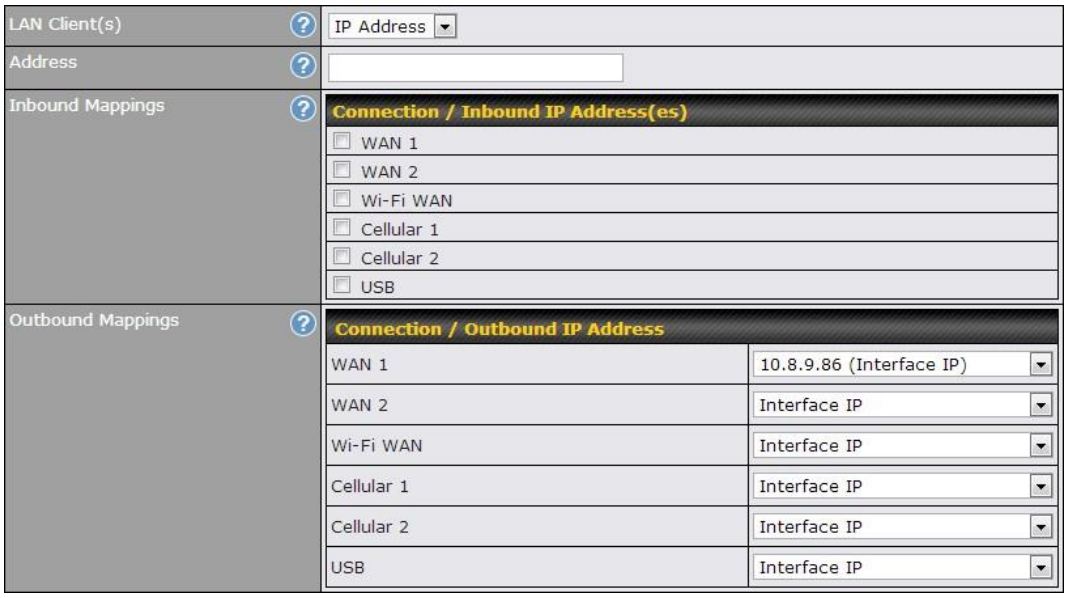
16 NAT Mappings

The configuration of NAT Mappings allows the IP address mapping of all inbound and outbound NAT'dtraffic to and from an internal client IP address.

The settings to configure NAT Mappings are located at ***Advanced>NAT Mappings***:



To add a rule for NAT Mappings, click **Add NAT Rule**, upon which the following screen will be displayed:



NAT Mapping Settings	
LAN Client(s)	NAT Mapping rules can be defined for a single LAN **IP Address**, an **IP Range**, or an **IP Network**.
Address	This refers to the LAN host's private IP address. The system maps this address to a number of public IP addresses, specified below, in order to facilitate inbound and outbound traffic. This option is only available when **IP Address** is selected.
Range	The IP range is a contiguous group of private IP addresses used by the LAN host. The system maps these addresses to a number of public IP addresses, specified below, to facilitate outbound traffic. This option is only available when **IP Range** is selected.

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Network	The IP network refers to all private IP addresses and ranges managed by the LAN host. The system maps these addresses to a number of public IP addresses, specified below, to facilitate outbound traffic. This option is only available when **IP Network** is selected.
Inbound Mappings	This setting specifies the WAN connections and corresponding WAN-specific Internet IP addresses on which the system should bind on. Any access to the specified WAN connection(s) and IP address(es) will be forwarded to the LAN Host. This option is only available when **IP Address** is selected in LAN Client(s) field. Note 1: Inbound Mapping is not needed for WAN connections in drop-in or IP forwarding mode. Note 2: Each WAN IP address can be associated to one NAT Mapping only.
Outbound Mappings	This setting specifies the WAN IP addresses should be used when an IP connection is made from a LAN host to the Internet. Each LAN host in an IP range or IP network will be evenly mapped to one of each selected WAN's IP addresses (for better IP address utilization) in a persistent manner (for better application compatibility). Note 1: If you do not want to use a specific WAN for outgoing accesses, you should still choose default here, then customize the outbound access rule in the Outbound Policy section. Note 2: WAN connections in drop-in or IP forwarding mode are not shown here.

Important Note

Inbound firewall rules override the Inbound Mapping settings.

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17 QoS

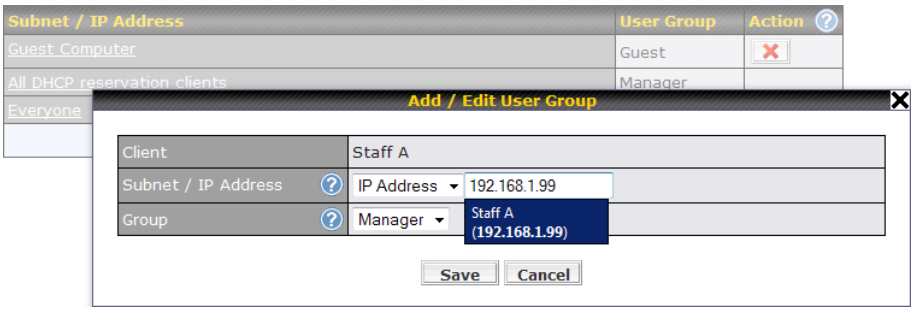
17.1 User Groups

LAN and PPTP clients can be categorized into three user groups - **Manager, Staff, and Guest**. This table allows you to define rules and assign client IP addresses or subnets to a user group. You can apply different bandwidth and traffic prioritization policies on each user group in the Bandwidth Control and Application sections.

The table is automatically sorted, and the table order signifies the rules' precedence.The smaller and more specific subnets are put towards the top of the table and have higher precedence; larger and less specific subnets are placed towards the bottom.

Click the **Add** button to define clients and their user group. Click the button to remove the defined rule.

Two default rules are pre-defined and put at the bottommost. They are **All DHCP reservation clients** and **Everyone**, and they cannot be removed. **All DHCP reservation clients** represents the LAN clients defined in the DHCP Reservation table in the LAN settings page. **Everyone** represents all clients that are not defined in any rule above. Click on a rule to change its group.



Add / Edit User Group	
Subnet / IP Address	From the drop-down menu, choose whether you are going to define the client(s) by an **IP Address** or a **Subnet**. If IP Address is selected, enter a name defined in DHCP Reservation table or a LAN client's IP address. If Subnet is selected, enter a subnet address and specify its subnet mask.
Group	This field is to define which **User Group** the specified Subnet / IP Address belongs to.

Once users have been assigned to a user group, their Internet traffic will be restricted by rules defined for that particular group. Please refer to the following two sections for details.

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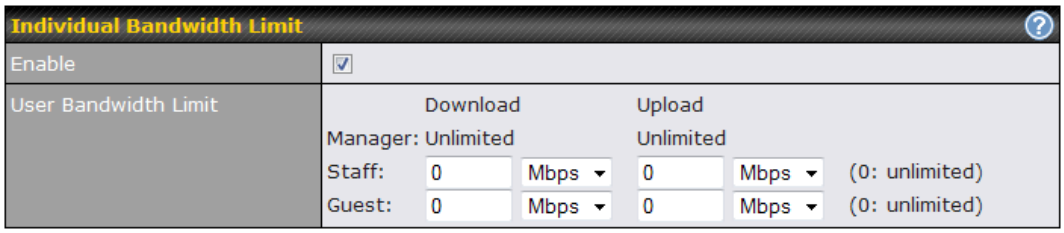
17.2 Bandwidth Control

You can define a maximum download speed (over all WAN connections) and upload speed (for each WAN connection) that each individual Staff and Guest member can consume. No limit can be imposed on individual Manager members.

By default, Download and Upload Bandwidth Limits are set to unlimited (set as **0**).



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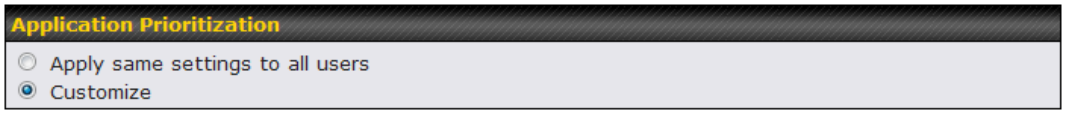
17.3 Application

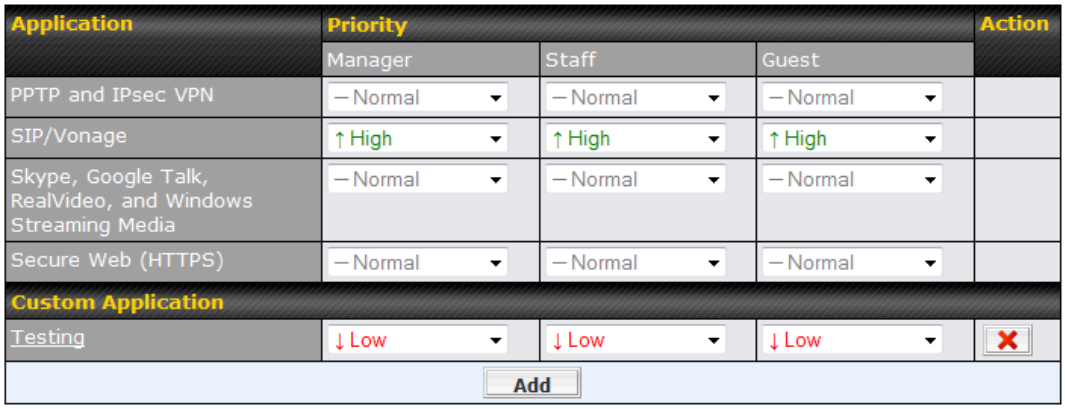
17.3.1 Application Prioritization

You can choose whether to apply the same Prioritization settings to all user groups or customize the settings for each group.



Three priority levels can be set for application prioritization: ↑ **High**,— **Normal**, and ↓ **Low**.

Four types of applications are predefined. Their priority for each user group can be selected from their corresponding drop down menu.Traffic types not defined in the table is assigned with normal priority.



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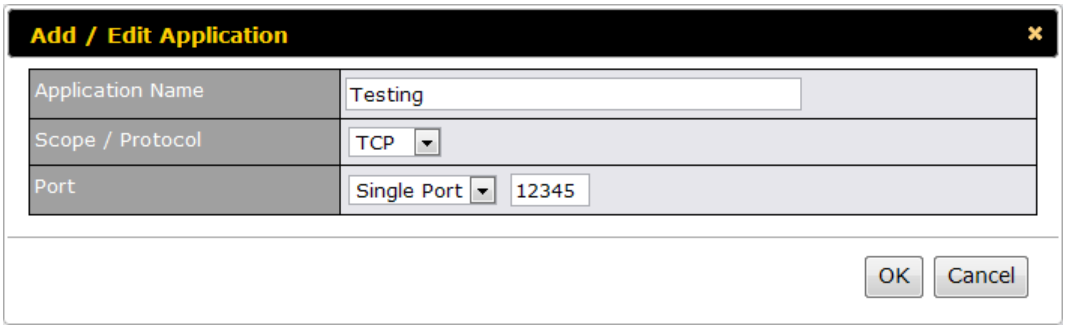
17.3.2 Prioritization for Custom Application

Clickthe **Add** button to define a custom application. Click the button in the **Action** column to delete the custom application in the corresponding row.



Application Prioritization	
PPTP and IPsec VPN	When enabled, any PPTP and IPsec traffic will be prioritized.
SIP/Vonage	When enabled, any SIP and Vonage voice traffic will be prioritized.
Skype, Google Talk, RealVideo, and Windows Streaming Media	When enabled, voice and video traffic of Skype, Google Talk, Real Video and Windows Streaming Media will be prioritized.
Secure Web (HTTPS)	When enabled, HTTPS (TCP port 443) traffic will be prioritized.

17.3.3 DSL/Cable Optimization

DSL/cable-based WAN connection has its upload bandwidth lower than the download bandwidth.When this option is enabled, the download bandwidth of the WAN can be fully utilized in any situation.

When a DSL/cable circuit's uplink is congested, the download bandwidth will be affected. Users will not be able to download data in full speed until the uplink becomes less congested.The DSL/Cable Optimization can relieve such issue. When it is enabled, the download speed will become less affected by the upload traffic.

By default, this feature is **enabled**.

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18 Firewall

A firewall is a mechanism that selectively filters data traffic between the WAN side (the Internet) and the LAN side of the network.It can protect the local network from potential hacker attacks, offensive Web sites, and/or other inappropriate uses.

The firewall functionality of the Pepwave MAX supports the selective filtering of data traffic in both directions:

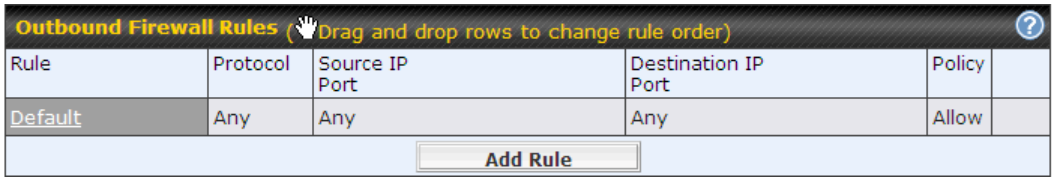
- Outbound (LAN to WAN)
- Inbound (WAN to LAN)
- Intrusion Detection and DoS Prevention

With SpeedFusion™ enabled (see Section11), the firewall rules also apply to VPN tunneled traffic.

18.1 Outbound and Inbound Firewall

18.1.1 Access Rules

The outbound firewall settings are located at: ***Advanced > Firewall > Outbound Firewall Rule.***



Upon clicking **Add Rule**, the following screen appears:

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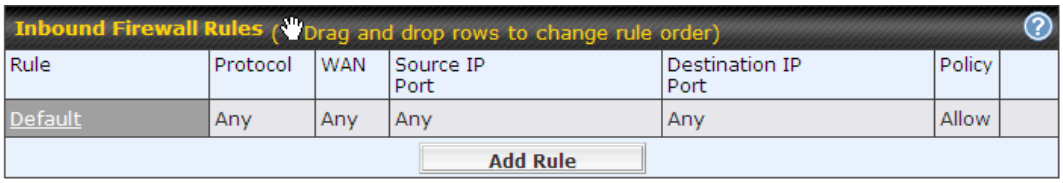
Inbound firewall settings are located at: ***Advanced > Firewall > Inbound Firewall Rule.***



Once you click on **Add Rule,** the following window will appear:

Rules are matched from top to the bottom.If a connection matches any one of the upper rules, the matching process will stop. If none of the rules is matching, the **Default** rule will be applied.

By default, the **Default** rule is set as **Allow** for both outbound and inbound access.

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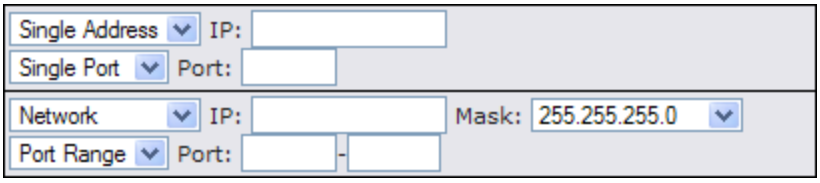
Inbound / Outbound Firewall Settings	
Rule Name	This setting specifies a name for the firewall rule.
Enable	This setting specifies whether the firewall rule should take effect. When **Yes** is selected, the firewall rule takes effect. If the traffic matches the specified Protocol/IP/Port, actions will be taken by the Pepwave MAX based on the other parameters of the rule. When **No** is selected, the firewall rule does not take effect. The Pepwave MAX will disregard the other parameters of the rule.
WAN Connection	This setting is applicable to Inbound Firewall Rules only. This setting specifies which WAN connection(s) the rule applies to: • **WAN 1** • **WAN 2** • **Wi-Fi WAN** • **Cellular 1** • **Cellular 2** • **USB** A value of**WAN 1, WAN 2, Wi-Fi WAN, Cellular 1, Cellular 2, … and USB** specifies that the rule applies to all WAN connections, Ethernet WAN, PC Card, … and Wi-Fi WAN, respectively.
Protocol	This setting specifies the protocol to be matched by the rule. Via a drop-down menu, the following protocols can be specified: • **TCP** • **UDP** • **ICMP** • **IP** Alternatively, the **Protocol Selection Tool** drop-down menu can be used to automatically fill in the Protocol and Port number of common Internet services (e.g. HTTP, HTTPS, etc.) After selecting an item from the Protocol Selection Tool drop-down menu, the Protocol and Port number remains manually modifiable.
Source IP & Port	This specifies the source IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots:  In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.
Destination IP & Port	This specifies the destination IP address(es) and port number(s) to be matched for a firewall rule. A single address, or a network, can be specified as the Source IP & Port setting, as indicated with the following screenshots:

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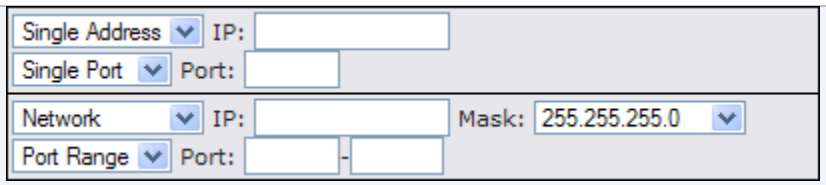

In addition, a single port, or a range of ports, can be specified for the Source IP & Port setting.

Action

This setting specifies the action to be taken by the Pepwave MAX upon encountering traffic that matches the both of the following:

- Source IP & Port
- Destination IP & Port
- With the value of **Allow** for the Action setting, the matching traffic passes through the Pepwave MAX (to be routed to the destination).
- If the value of the Action setting is set to **Deny**, the matching traffic does not pass through the Pepwave MAX (and is discarded).

Event Logging

This setting specifies whether or not to log matched firewall events.

The logged messages are shown on the page **Status >Event Log**.

A sample message is as follows:

```
Aug 13 23:47:44 Denied CONN=Ethernet WAN SRC=20.3.2.1
DST=192.168.1.20 LEN=48 PROTO=TCP SPT=2260 DPT=80
```

- **CONN**: The connection where the log entry refers to
- **SRC**: Source IP address
- **DST**: Destination IP address
- **LEN**: Packet length
- **PROTO**: Protocol
- **SPT**: Source port
- **DPT**: Destination port

Tip

If the default inbound rule is set as **Allow** for NAT enabled WANs, no inbound Allow firewall rules will be required for inbound Port Forwarding and inbound NAT Mapping rules. However, if the default inbound rule is set as **Deny**, a corresponding Allow firewall rules will be required.

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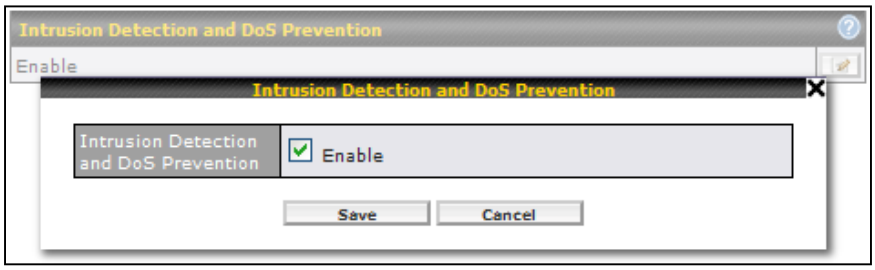
18.1.1.1 Intrusion Detection and DoS Prevention



The Pepwave MAX supports detecting and preventing intrusions and Denial-of-Service (DoS) attacks from the Internet. To turn on this feature, click , check the box **Enable** for the **Intrusion Detection and DoS Prevention** and press the **Save** button.

When this feature is enabled, the Pepwave MAX will detect and protect the network from the following kinds of intrusions and denial-of-service attacks.

- Port Scan:
  - NMAP FIN/URG/PSH
  - Xmas Tree
  - Another Xmas Tree
  - Null Scan
  - SYN/RST
  - SYN/FIN
- SYN Flood Prevention
- Ping Flood Attack Prevention

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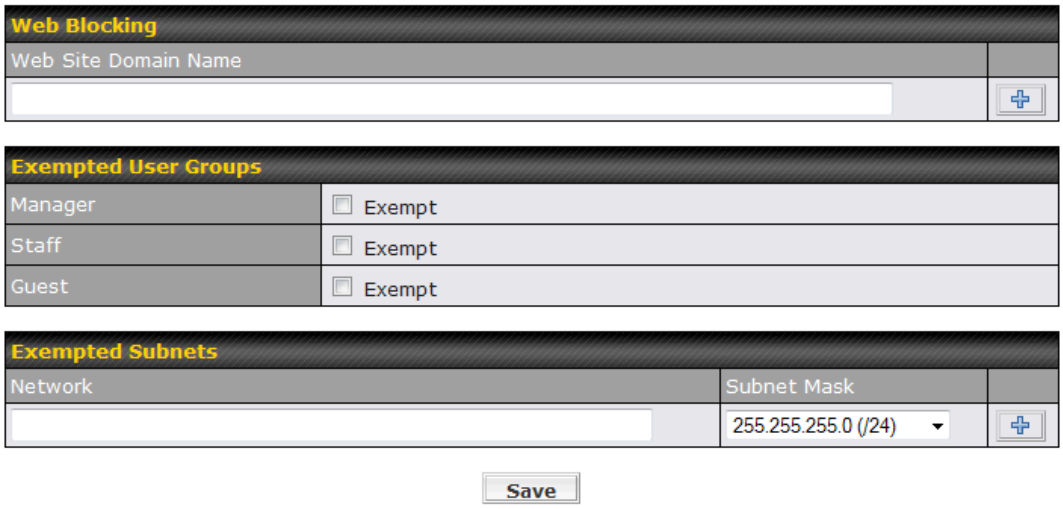
18.1.2 Web Blocking



18.1.2.1 Web Blocking

Enter an appropriate website address and the Pepwave MAX will block and disallow LAN/PPTP/SpeedFusion™ peer clients to access these websites.

You may enter the wild card ".*" at the end of a domain name to block any web site with a host name having the domain name in the middle.
For example, If you enter "foobar.*," then "www.foobar.com," "www.foobar.co.jp," or "foobar.co.uk" will be blocked.
Placing the wild card in any other position is not supported.
The Pepwave MAX will inspect and look for blocked domain names on all HTTP traffic. Secure web (HTTPS) traffic is not supported.

18.1.2.2 Exempted User Groups

Check and select pre-defined user group(s) who can be exempted from the access blocking rules. User groups can be defined at ***QoS > User Groups*** section. Please refer to section **Error! Reference source not found.** for details.

18.1.2.3 Exempted Subnets

With the subnet defined in the field, clients on the particular subnet(s) can be exempted from the access blocking rules.

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19 Miscellaneous Settings

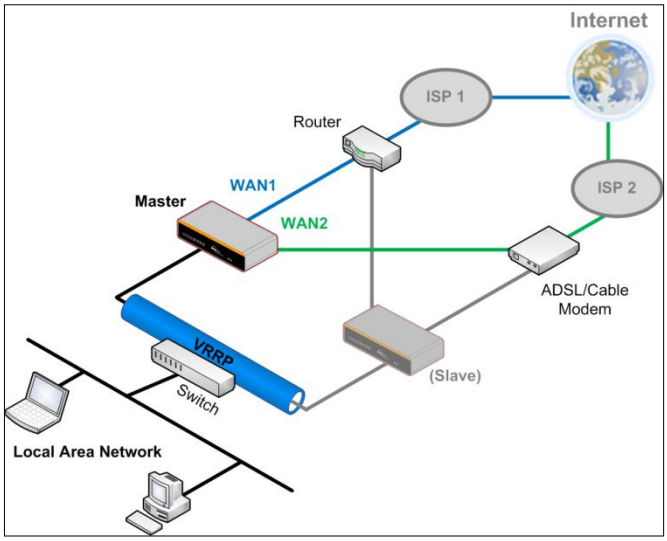
Themiscellaneous settings include configuration forPPTP Server,Service Forwarding, and Service Passthrough.

19.1 High Availability

(Available on Pepwave MAX HD2 and 700)

The Pepwave MAX supports High Availability (HA) configurations via an open standard Virtual Router Redundancy Protocol (VRRP, RFC 3768).

In an HA configuration, two Pepwave MAX units provide redundancy and failover in a master-slave arrangement. In the event that the Master Unit is down, the Slave Unit becomes active. High Availability will be disabled automatically where there is a Drop-in connection configured on a LAN Bypass port:



In the diagram, the WAN ports of each Pepwave MAX unit connect to the router and to the modem. Both Pepwave MAX units connect to the same LAN switch via a LAN port.

An elaboration on the technical details of the implementation, by Pepwave MAX, of Virtual Router Redundancy Protocol (VRRP, RFC 3768) is as follows:

- In an HA configuration, the two Pepwave MAX units communicate with each other using VRRP over the LAN.
- The two Pepwave MAX units broadcast heartbeat signals to the LAN at a frequency of one heartbeat signal per second.
- In the event that no heartbeat signal from the Master Pepwave MAX unit is received in 3 seconds (or longer) since the last heartbeat signal, the Slave Pepwave MAX unit becomes active.
- The Slave Pepwave MAX unit initiates the WAN connections, and binds to a previously configured LAN IP address.
- At a subsequent point when the Master Pepwave MAX unit recovers, it will once again become active.

You can configure High Availability at the following location: ***Network > Misc. Settings > High Availability***:

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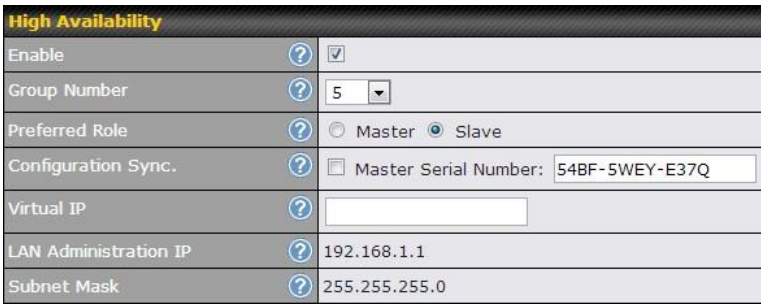
Interface for Master Router

Interface for Slave Router



High Availability	
Enable	Checking this box specifies that the Pepwave MAX unit is part of a High Availability configuration.
Group Number	This number identifies a pair of Pepwave MAX units operating in a High Availability configuration. The two Pepwave MAX units in the pair must have the same Group Number value.
Preferred Role	This setting specifies whether the Pepwave MAX unit operates in Master or Slave mode. Click the corresponding radio button to set the role of the unit. One of the units in the pair must be configured as the Master and the other unit must be configured as the Slave
Resume Master Role Upon Recovery	This option is displayed when **Master** mode is selected in Preferred Role. If this option is enabled, once the device has recovered from an outage, it will take over and resume its **Master** role from the slave unit.
Configuration Sync.	This option is displayed when **Slave** mode is selected in Preferred Role. If this option is **enabled** and the **Master Serial Number** entered matches with the actual master unit's, the master unit will automatically transfer the configuration to this unit. Please make sure the LAN IP Address and the Subnet Mask fields are set correctly in the LAN Settings page. You can refer to the **Event Log** for the configuration synchronization status.
Master Serial Number	If the box **Configuration Sync.** is checked, the serial number of the Master unit is required here for the feature to work properly.
Virtual IP	The HA pair must share the same Virtual IP. This Virtual IP and the LAN Administration IP must be under the same network.
LAN Administration IP	This setting specifies a LAN IP address to be used for accessing administration functionality. This address should be unique within the LAN.
Subnet Mask	This setting specifies the subnet mask of the LAN.

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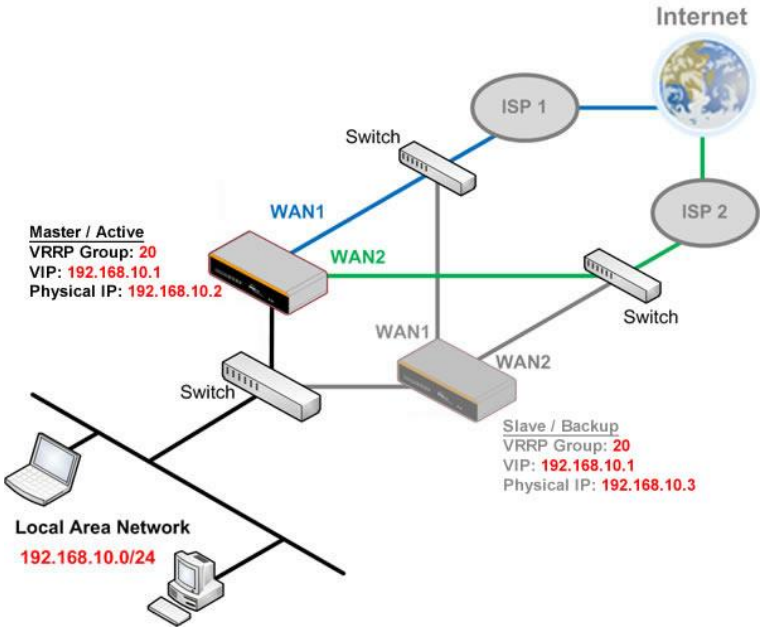
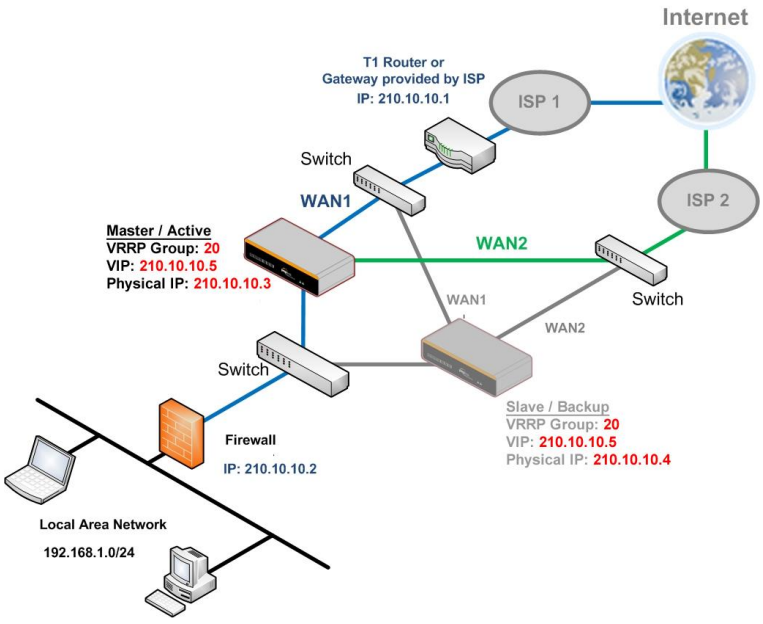
Important Note

For MAX routers in NAT mode, the Virtual IP (VIP) should be set as the default gateway for all hosts sitting on the LAN segment. For example, a firewall sitting behind the MAX router should set its default gateway as the Virtual IP instead of the IP of Master MAX unit.



In Drop-in mode, no other configuration needs to be set.



Please note that the Drop-in WAN cannot be configured as a LAN Bypass port while it is configured for High Availability.

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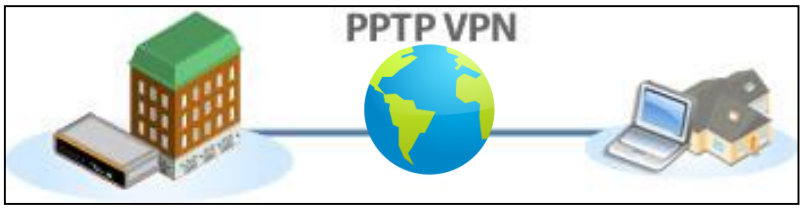
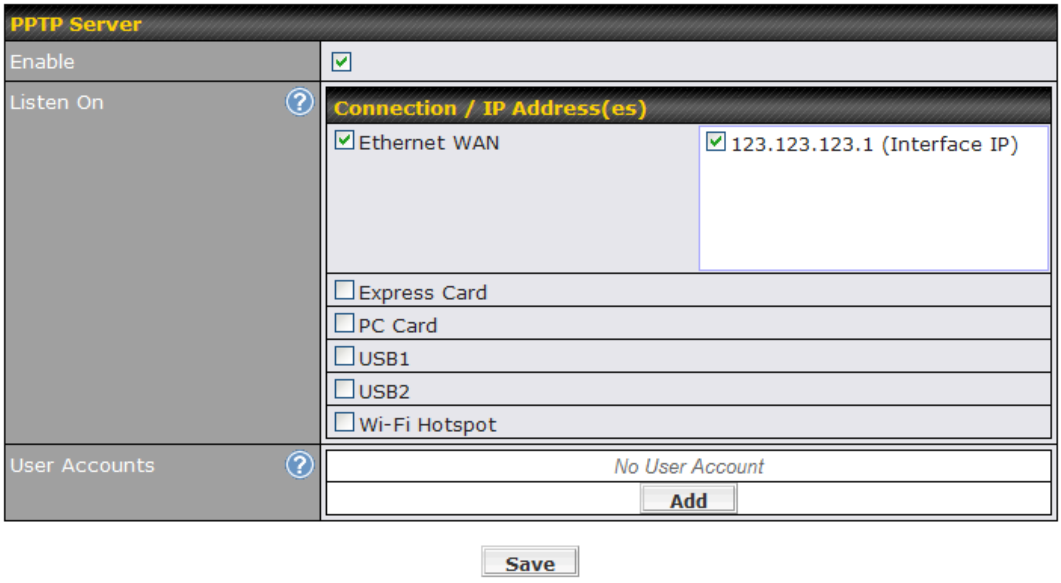
19.2 PPTP Server

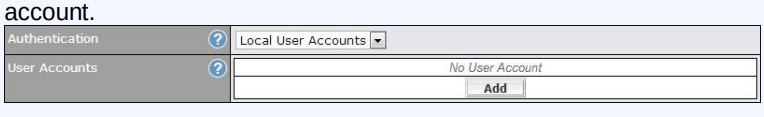


The Pepwave MAX has a built-in PPTP Server, which enables remote computers to conveniently and securely access the local network.

PPTP server setting is located at ***Advanced >Misc. Settings >PPTP Server.***

Simply check the box to enable the PPTP server function. All connected PPTP sessions are displayed on the Client List at ***Status > Client List***. Please refer to section 22.3 for details.



PPTP Server Setting	
Listen On	This setting is for specifying the WAN connection(s) and IP address(es) where the PPTPserver should listen on.
Authentication	Select the source of user databases for PPTP authentication. **Local User Accounts** - User accounts are stored in the device locally. You can add/modify/delete the accounts in the User Accounts table below, click **Add** to add a new account.  **LDAP Server** - Authenticate with an external LDAP server. Tested with OpenLDAP server where passwords are NTLM hashed. Active Directory is not supported. (You can choose to

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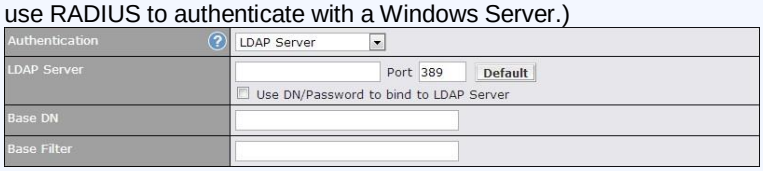
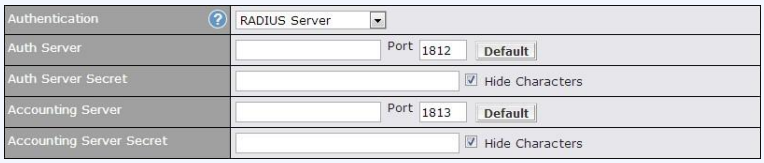
use RADIUS to authenticate with a Windows Server.)



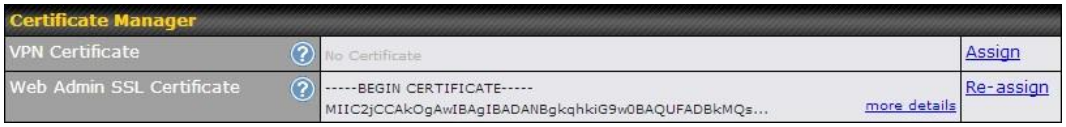
RADIUS Server - Authenticate with an external RADIUS server. Tested with Microsoft Windows Internet Authentication Service, and FreeRADIUS servers where passwords are NTLM hashed or in plain text.



User Accounts

This setting allows you to define the PPTP User Accounts. Click **Add** to input usernameand password to create an account. After adding the user accounts, you can click on ausername to edit the account password. Click the button to delete the account in itscorresponding row.

19.3 Certificate Manager



This section allows you to assign certificates for Local VPN and Web Admin SSL. The local keys will not be transferred to another device by any means.

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19.4 Service Forwarding

Service Forwarding settings are located at ***Advanced>Misc. Settings >Service Forwarding***:

Service Forwarding	
SMTP Forwarding	When this option is enabled, all outgoing SMTP connections destined for any host at TCP port 25 will be intercepted. These connections will be redirected to a specified SMTP server and port number. SMTP server settings for each WAN can be specified after selecting **Enable**.
Web Proxy Forwarding	When this option is enabled, all outgoing connections destined for the proxy server specified in Web Proxy Interception Settings will be intercepted. These connections will be redirected to a specified web proxy server and port number. Web Proxy Interception Settings and proxy server settings for each WAN can be specified after selecting **Enable**.
DNS Forwarding	When this option is enabled, all outgoing DNS lookups will be intercepted and redirected to the built-in DNS name server. If any LAN device is using DNS name servers of a WAN connection, you may want to enable this option to enhance the DNS availability without modifying the DNS server setting of the clients. The built-in DNS name server will distribute DNS lookups to corresponding DNS servers of all available WAN connections. In this case, DNS service will not be interrupted even if any WAN connection is down.

19.4.1 SMTP Forwarding

Some ISPs require their users to send e-mails via the ISP's SMTP server. All outgoing SMTP connections are blocked except those connecting to the ISP's.The Pepwave MAX supports intercepting and redirecting all outgoing SMTP connections (destined for TCP port 25) via a WAN connection to the WAN's corresponding SMTP server.

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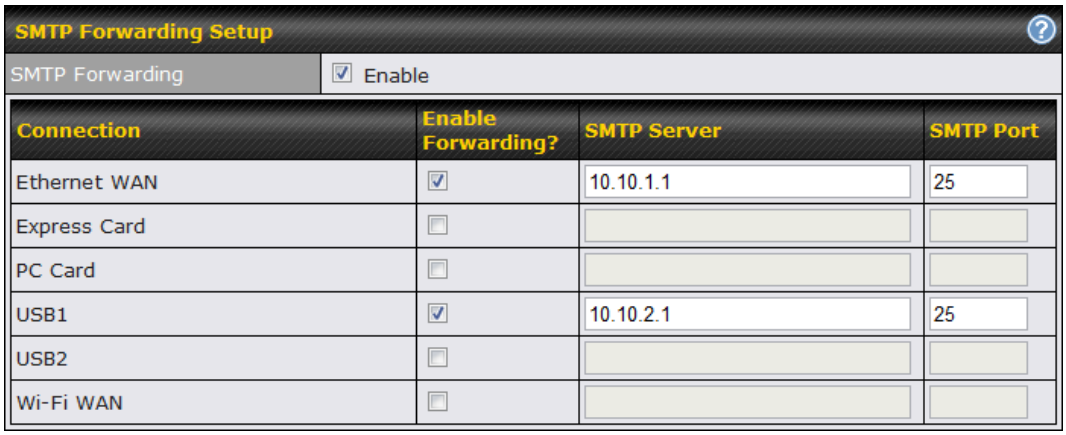

To enable the feature, select the **Enable** check box under **SMTP Forwarding Setup**. Check the box **Enable Forwarding?**For the WAN connection(s) that needs such forwarding. Enter the ISP's e-mail server address and TCP port number for each WAN.

The Pepwave MAX will intercept SMTP connections, choose a WAN with reference to the Outbound Policy, and then forward the connection to the forwarded SMTP server if the chosen WAN has enabled forwarding. If the forwarding is disabled for a WAN connection, SMTP connections for the WAN will be simply forwarded to the connection's original destination.

Note
If you want to route all SMTP connections only to particular WAN connection(s), you should create a rule in Outbound Policy (see section 13.2).

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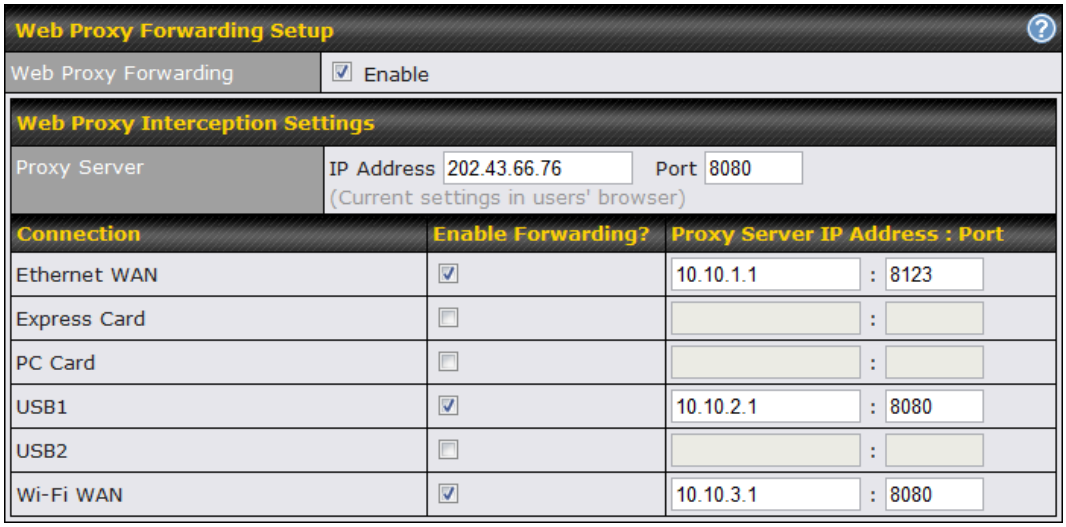
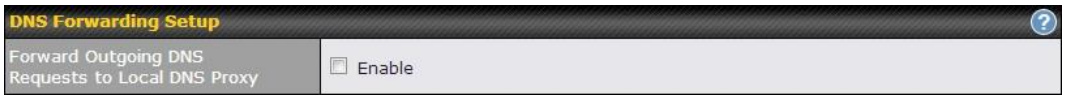
19.4.2 Web Proxy Forwarding



When this feature is enabled, the Pepwave MAX will intercept all outgoing connections destined for the proxy server specified in **Web Proxy Interception Settings**, choose a WAN connection with reference to the Outbound Policy, and then forward them to the specified web proxy server and port number. Redirected server settings for each WAN can be set here.If forwarding is disabled for a WAN, web proxy connections for the WAN will be simply forwarded to the connection's original destination.

19.4.3 DNS Forwarding



When DNS Forwarding is enabled, all clients' outgoing DNS requests will also be intercepted and forwarded to the built-in DNS proxy server.

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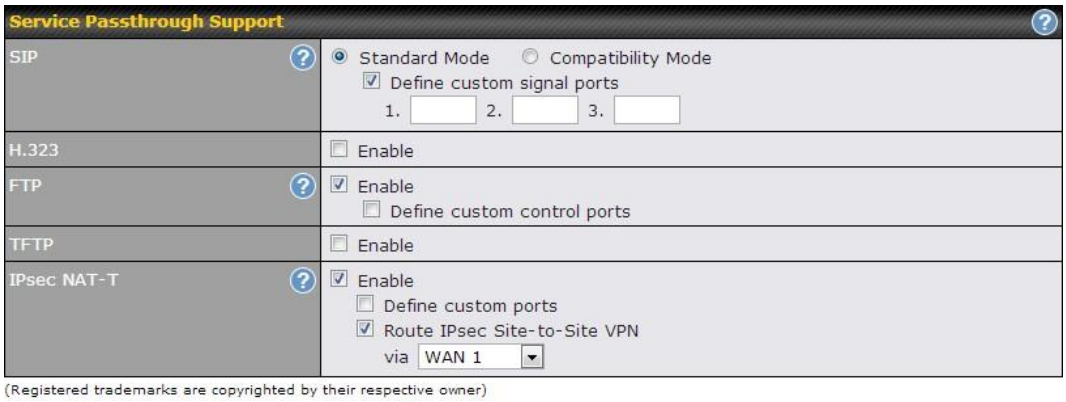
19.5 Service Passthrough

Service Passthrough settings can be found in ***Advanced > Misc. Settings > Service Passthrough***:



Some Internet services required to be specially handled in a multi-WAN environment. The Pepwave MAX supports handling such services correctly such that Internet applications do not notice it is behind a multi-WAN router. Settings for Service Passthrough Support are available here.

Service Passthrough Support	
SIP	Session Initiation Protocol, aka SIP, is a voice-over-IP protocol. The Pepwave MAX can act as a SIP Application Layer Gateway (ALG) which binds connections for the same SIP session to the same WAN connection and translate IP address in the SIP packets correctly in NAT mode. Such passthrough support is always enabled and there are two modes for selection: **Standard Mode** and **Compatibility Mode**. If your SIP server's signal port number is non-standard, you can check the box **Define custom signal ports** and input the port numbers to the text boxes.
H.323	With this option enabled, protocols that provide audio-visual communication sessions will be defined on any packet network and passthrough the device.
FTP	FTP sessions consist of two TCP connections; one for control and one for data. In multi-WAN situation, they have to be binded to the same WAN connection. Otherwise, problems will arise in transferring files. By default, the Pepwave MAX monitors TCP control connections on port 21 for any FTP connections and binds TCP connections of the same FTP session to the same WAN. If you have an FTP server listening on a port number other than 21, you can check the box **Define custom control ports** and enter the port numbers to the text boxes.
TFTP	The Pepwave MAX monitors outgoing TFTP connections and routes any incoming TFTP data packets back to the client. Select **Enable** if you want to enable the TFTP Passthrough support.
IPsec NAT-T	This field is for enabling the support of IPsec NAT-T Passthrough. UDP ports 500, 4500 and 10000 are monitored by default. You may add more custom data ports that your IPsec system uses by checking the box Define custom ports. If the VPN contains IPsec Site-to-Site VPNtraffic, you have to check the box Route IPsec Site-to-Site VPN and choose the WAN connection to route the traffic to. If you have IPsec SpeedFusion™ traffic routed, check the Route IPsec SpeedFusion™ option and select a WAN to force routing such traffic to the specified WAN.

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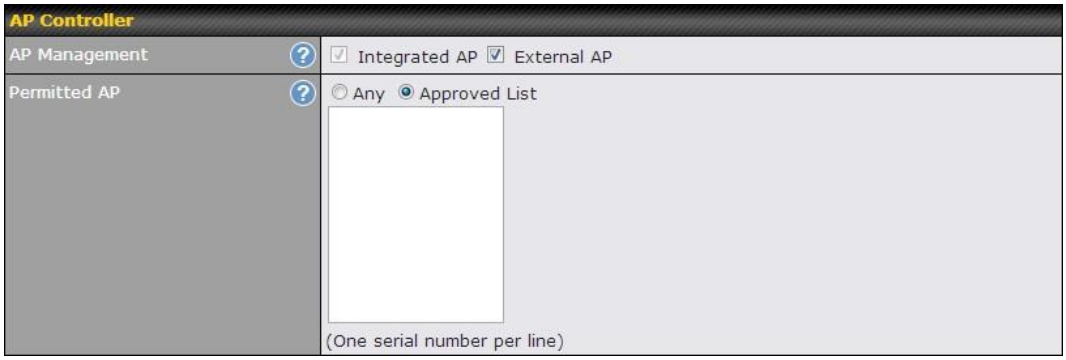
20 AP

The AP Controller acts as a centralized controller of Pepwave AP devices. With this feature, users will be able to customize and manage multiple AP one a single Peplink Balance Interface.

To configure, navigate to the ***AP*** tab and the following options will be shown.

20.1 Wireless SSID

This menu is the first one that appears upon clicking on the **AP** tab. This screen could also be reached by clicking on **AP > Wireless SSID**.



AP Controller	
AP Management	The AP Controller for managing Pepwave APs can be enabled by this option. By default, the Pepwave MAX has an **integrated AP**, which it will always control. By clicking the **External AP**, the MAX unit will also control access points connected on its LAN. When this option is enabled, the AP Controller will wait for management connections originating from APs over the LAN on TCP and UDP port 11753. It will also wait for captive portal connections on TCP port 443. An extended DHCP option "CAPWAP Access Controller addresses" (field 138) will be added to the DHCP server. A local DNS record "wlancontroller" will added to the local DNS proxy.
Permitted AP	With this option enabled, protocols that provide audio-visual communication sessions will be defined on any packet network and passthrough the device.

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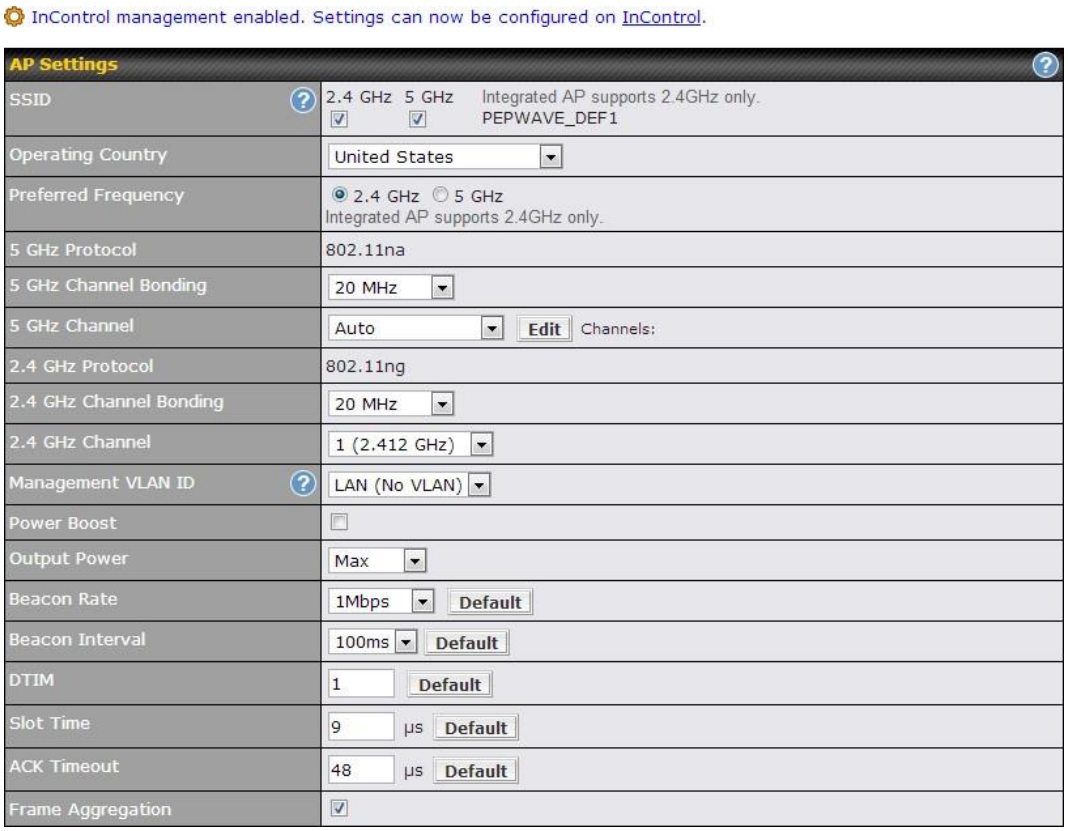
20.2 Settings



AP Settings	
SSID	These buttons specify which wireless networks will use this AP Profile. You can also select the frequencies at which each network will transmit. Please note that the Peplink Balance does not detect weather the AP is capable of transmitting at both frequencies. Instructions to transmit at unsupported frequencies will be ignored by the AP.
Operating Country	This drop-down menu specifies the national / regional regulations which the AP should follow. • If a North American region is selected, RF channels 1 to 11 will be available and the maximum transmission power will be 26 dBm (400 mW). • If European region is selected, RF channels 1 to 13 will be available. The maximum transmission power will be 20 dBm (100 mW). NOTE: Users are required to choose an option suitable to local laws and regulations.
Preferred Frequency	These buttons determine the frequency at which access points will attempt to broadcast. This feature will only work for AP that can transmit at both 5.4GHz and 5GHz frequencies,
Protocol	This section displays the wireless protocols which your AP are using.

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(5GHz, 2.4 GHz)	
Channel Bonding (5GHz, 2.4 GHz)	This drop-down menu is only available for 802.11bgn or 802.11n protocols only. There are three options: 20 MHz, 20/40 MHz and 40 MHz With this feature enabled, it allows the Wi-Fi system to use two channels at once. Using two channels improves the performance of the Wi-Fi connection
Channel (5GHz, 2.4 GHz)	This drop-down menu selects the 802.11 channel to be utilized. Available options are from 1 to 11, and from 1 to 13 for the country setting of North America region and Europe region, respectively. (Channel 14 is only available when the country is selected as Japan with protocol 802.11b.) If Auto is set, the system would perform channel scanning based on the scheduled time set and choose the most suitable channel automatically.
Management VLAN ID	This field specifies the VLAN ID to tag to management traffic, such as AP to AP-controller communication traffic. The value is zero by default, meaning that no VLAN tagging will be applied. NOTE: Change this value with caution as alterations may result in loss of connection to the AP controller.
Power Boost [A]	With this option enabled, the AP under this profile will transmit using additional power. Please note that using this option with several AP in close proximity will lead to increased interference.
Output Power [A]	This drop-down menu determines the power at which the AP under this profile will broadcast. When fixed settings are selected, the AP will broadcast at the specified power level regardless of context. When Dynamic settings are selected, the AP will adjust its power level based on its surrounding AP in order to maximize performance. The **Dynamic: Auto** setting will set the AP to do this automatically. Otherwise, the **Dynamic: Manual** setting will set the AP to dynamically adjust only of instructed to do so. If you have set Dynamic: Manual, you can go to **AP > Toolbox > Auto Power Adj.** to give your AP further instructions.
Beacon Rate [A]	This drop-down menu provides the option to send beacon in different transmit bit rate and the bit rates are: 1Mbps, 2Mbps, 5.5Mbps, 6Mbps, 11Mbps.
Beacon Interval [A]	This drop-down menu provides the option to set the time between each beacon send. Available options are: 100ms, 250ms and 500ms.
DTIM [A]	This field provides the option to set the frequency for beacon to include Delivery Traffic Indication Message, DTIM. The interval unit is measured in milliseconds.
Slot Time [A]	This field provides the option to modify the unit wait time before it transmits. The default value is 9µs.
ACK Timeout [A]	This field provides the option to set the wait time to receive acknowledgement packet before doing retransmission. The default value is 48µs.
Frame Aggregation [A]	With this feature enabled, throughput will be increased by sending two or more data

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	frames in a single transmission.

[A] - Advanced feature, please click the button on the top right hand corner to activate.

Web Administration Settings (on External AP)	
Enable	Check the box to allow Peplink Balance to manage the web admin access information of the AP.
Web Access Protocol	These buttons specify the web access protocol used for accessing the web admin of AP. The two available options are HTTP and HTTPS.
Management Port	This field specifies the management port used for accessing the device.
HTTP to HTTPS Redirection	This option will be available if you have chosen HTTPS as the Web Access Protocol. With this enabled, any HTTP access to the web admin will be redirect to HTTPS automatically.
Admin User Name	This field specifies the administrator username of the web admin. It is set as admin by default.
Admin Password	This field allows you to specify a new administrator password. You may also click the Generate button and let the system generate a random password automatically.

20.3 Toolbox

Additional tools for managing firmware packs can be found under **AP > Toolbox**.

Firmware Packs
This is the first menu that will appear. Here, you can manage the firmware of your AP. Clicking on will result in information regarding each firmware pack. To receive new firmware packs, you can either press Check for Updates to download new packs or you can press Manual Upload to manually upload a firmware pack. Press Default... to define which firmware pack is default.

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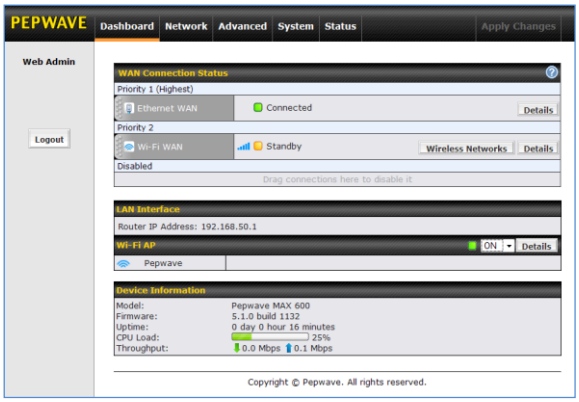
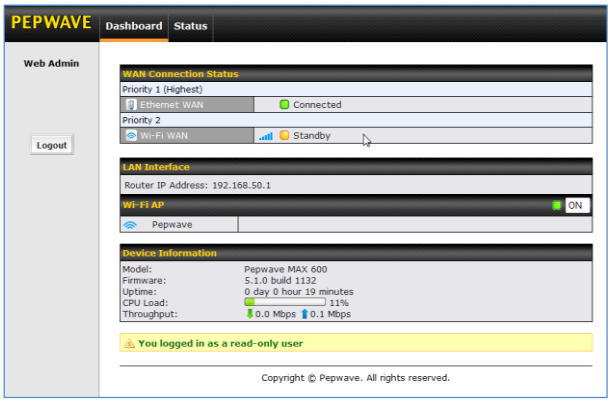
21 System Settings

21.1 Admin Security

There are two user accounts available for accessing the Web Admin.Usernames are **admin** and **user**. They represent two user levels - **admin** has full administration access, while **user** is a read-only account. The read-only account can only access the device's status information and cannot make any change on the device.



Admin Account UI



User Account UI

A web login session will be logged out automatically when it has been idle longer than the **Web Session Timeout**. Before the session expires, you may click the Logout button in the Web Admin to exit the session

0 hours 0 minutes signifies an unlimited session time. This setting should be used only in special situations, as it will lower the system security level if users do not logout before closing the browser.

Default: 4 hours 0 minutes.

For security reason, after logging in to the Web Admin Interface for the first time, it is recommended to change the administrator password.

Configuring the administration interface to be accessible only from the LAN can further improve system security.

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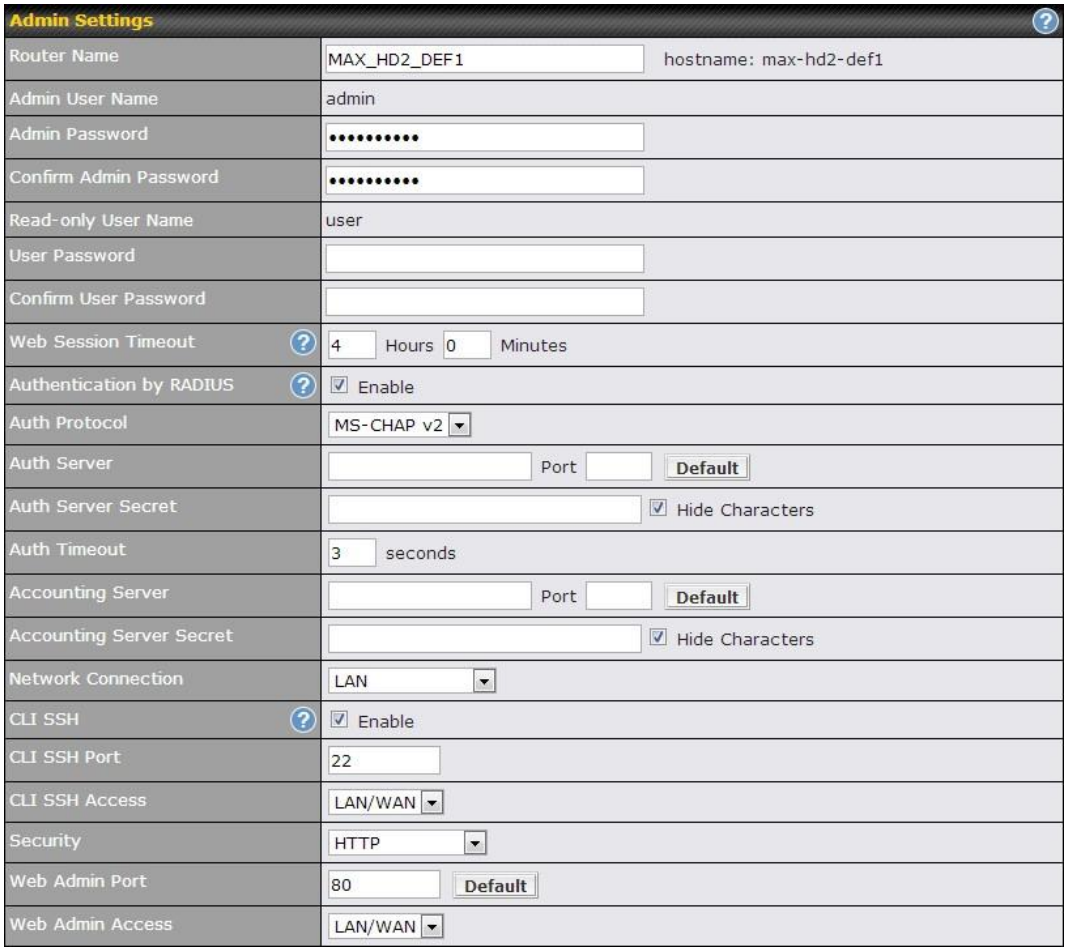
Administrative Settings configuration is located at ***System>Admin Security***:



Admin Settings	
Router Name	This field allows you to define a name for this Pepwave MAX unit. By default, Router Name is set as **MAX_XXXX**, where XXXX refers to the last 4 digits of the serial number of the device.
Admin User Name	It is set as **admin** by default and is not customizable.
Admin Password	This field allows you to specify a new administrator password.
Confirm Admin Password	This field allows you to verify and confirm the new administrator password.
Read-only User Name	It is set as **user** by default and is not customizable.
User Password	This field allows you to specify a new user password. Once the user password is set, the feature of read-only user will be enabled.
Confirm User Password	This field allows you to verify and confirm the new user password.
Web Session Timeout	This field specifies the number of hours and minutes that a web session can remain idle before the device terminates its access to Web Admin Interface. By default, it is set as **4 hours**.
Authentication by RADIUS	With this box is checked, Web Admin will authenticate using an external RADIUS server. Authenticated users are treated as "admin" with full read-write permission or “user”

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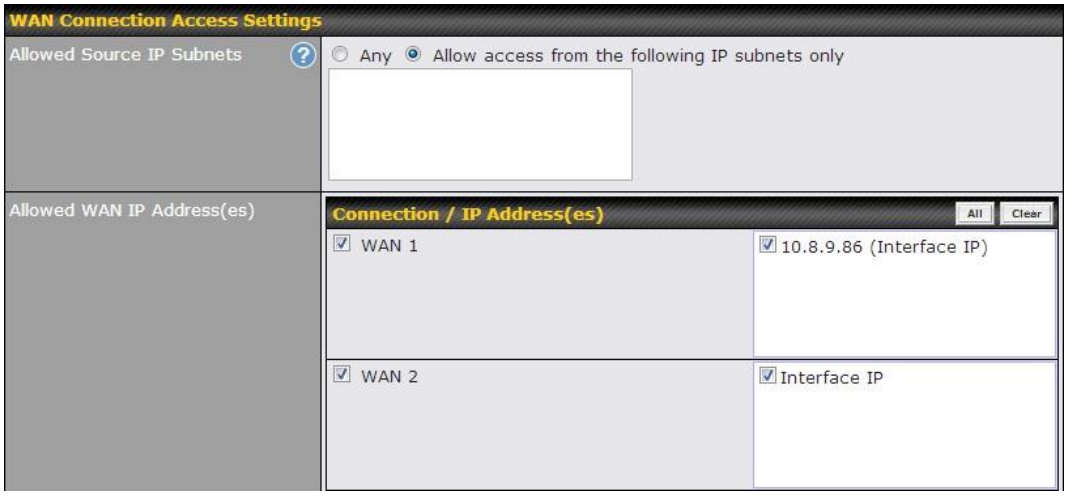
	with read-only access.Local "admin" and "user" accounts will be disabled. When the device is not able to communicate with the external RADIUS server, local accounts will be enabled again for emergency access. Authentication options will be available once this box is checked.
Auth Protocol	This specifies the authentication protocol used. Available options are **MS-CHAP v2** and **PAP**.
Auth Server	This specifies the access address of the external RADIUS server.
Auth Server Secret	This is the secret for accessing the RADIUS server.
Auth Timeout	This option specifies the time value for authentication timeout.
Accounting Server	This specifies the access address of the external Accounting server.
Accounting Server Secret	This is the secret for accessing the Accounting server.
Network Connection	This option is for specifying the network connection which will be used for authentication connection. Users can choose from LAN, WAN and VPN connections.
CLI SSH	CLI (Command Line Interface) can be accessed via SSH. This field enables the CLI support.
CLI SSH Port, CLI SSH Access	These settings specify which TCP port and which interface(s) to accept remote SSH CLI access. The user name and password used for remote SSH CLI access are the same as those for web admin access.
Security	This option is for specifying the protocol(s) through which the Web Admin Interface can be accessible: • HTTP • HTTPS • HTTP/HTTPS
Web Admin Port	These fields are for specifying the port number at which the Web Admin Interface can be accessible.
Web Admin Access	This option is for specifying the network interfaces through which the Web Admin Interface can be accessible: • LAN only • LAN/WAN • If LAN/WAN is chosen, a WAN Connection Access Settings form will be displayed.



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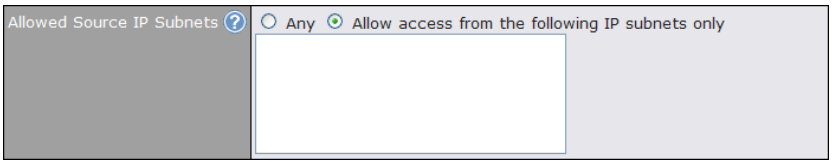
WAN Connection Access Settings

Allowed Source IP Subnets

This field allows you to restrict web admin access only from defined IP subnets.

- **Any** - Allow web admin accesses to be from anywhere, without IP address restriction.
- **Allow access from the following IP subnets only** - Restrict web admin access only from the defined IP subnets. When this is chosen, a text input area will be displayed beneath:



The allowed IP subnet addresses should be entered into this text area. Each IP subnet must be in form of w.x.y.z/m

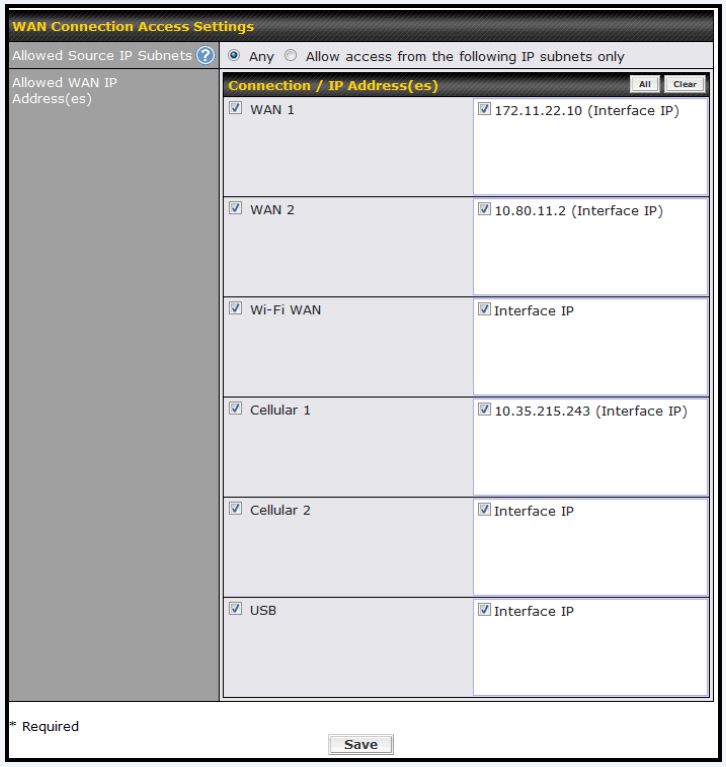
Where w.x.y.z is an IP address (e.g. 192.168.0.0), andm is the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: 192.168.0.0/24

To define multiple subnets, separate each IP subnet one in a line. For example:

- 192.168.0.0/24
- 10.8.0.0/16

Allowed WAN IP Address(es)

This is to choose which WAN IP address(es) the web server should listen on.



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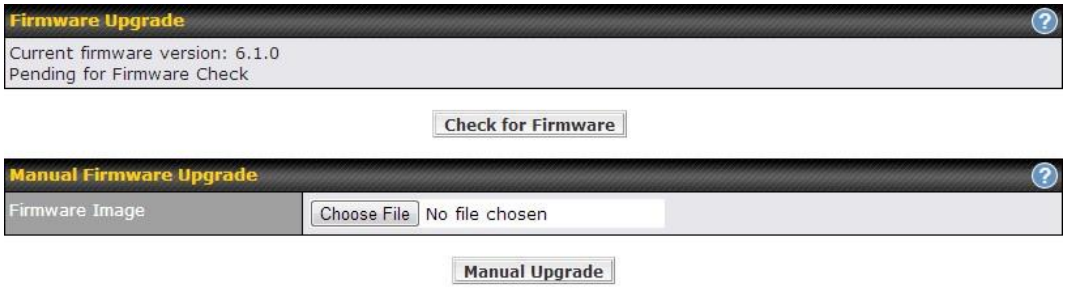
21.2 Firmware Upgrade

The firmware of the Pepwave MAX is upgradeable through Web Admin Interface.

Firmware upgrade functionality is located at ***System> Firmware***:



There are two ways to upgrade the unit. The first method is online firmware upgrade. The system can Check, Download and Upgrade over the Internet. The second method is to upload a firmware file manually.

Click on the **Check again** button to use online upgrade. With online upgrade, Pepwave MAX checks online for new firmware. If a new firmware is available, the Pepwave MAX will automatically download the firmware. The upgrade process will subsequently be automatically initiated.

You may also download a firmware image from the Pepwave web site and update the unit manually.Click **Browse** to select the firmware file from the local computer, and then click **Manual Upgrade** to send the firmware to the Pepwave MAX. The Pepwave MAX will then automatically initiate the firmware upgrade process.

Please note that all Pepwave devices are equipped to be able to store two different firmware versions in two different partitions. A firmware upgrade preformed will always replace the inactive partition. If you want to keep the inactive firmware, you can simply reboot your device with the inactive firmware and then perform the firmware upgrade.

Important Note
The firmware upgrade process may not necessarily preserve the previous configuration, and the behavior varies on a case-by-case basis. Consult the Release Notes for the particular firmware version. Do not disconnect the power during firmware upgrade process. Do not attempt to upload a non-firmware file, or a firmware file that is not qualified, or not supported, by Pepwave. Upgrading a Pepwave MAX with an invalid firmware file will damage the unit, and may void the warranty.

Important Note
If the firmware is rolled back from 5.x to 4.x, the configurations will be lost.

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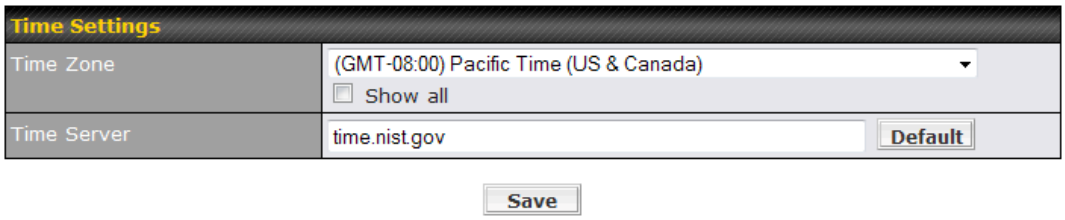
21.3 Time

The Time Server functionality enables the system clock of the Pepwave MAX to be synchronized with a specified Time Server.

The settings for Time Server configuration are located at ***System > Time***:

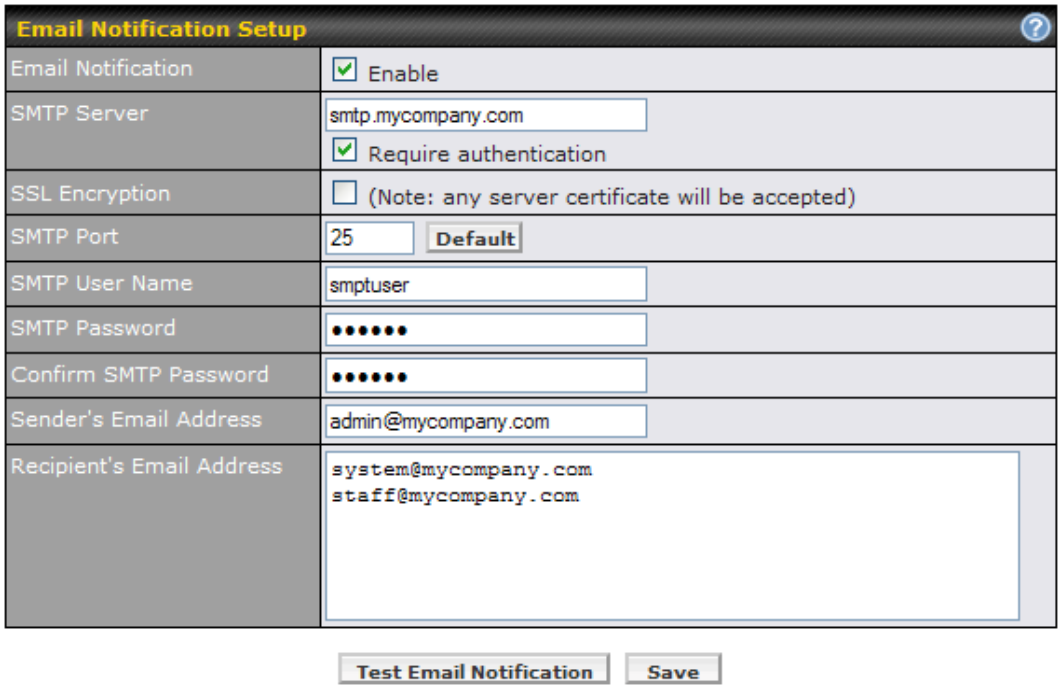


Time Server Settings	
Time Zone	This specifies the time zone (along with the corresponding Daylight Savings Time scheme) in which the Pepwave MAX operates. The Time Zone value affects the time stamps in the Event Log of the Pepwave MAX and E-mail notifications. Checked the box **Show all** to show all available time zone options.
Time Server	This setting specifies the NTP network time server to be utilized by the Pepwave MAX.

21.4 Email Notification

The Email Notification functionality of the Pepwave MAX provides a System Administrator with up-to-date information on network status.

The settings for configuring Email Notification arefound at ***System> Email Notification***:



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Email Notification Settings	
Email Notification	This option is for enabling Email Notification. If the box **Enable** is checked, the Pepwave MAX sends email messages to a System Administrator when the WAN status changes, or when new firmware is available. If the box Enable is not checked, Email Notification is disabled and the Pepwave MAX will not send email messages.
SMTP Server	This field is for specifying the SMTP server to be used for sending email. If the server requires authentication, check the box **Require authentication**.
SSL Encryption	Check the box to enable SMTPS. When the box is checked, the next field **SMTP Port** will be changed to **465** automatically.
SMTP Port	This field is for specifying the SMTP Port number. By default, this is set to 25; when the **SSL Encryption** box is checked, the default port number will be set to **465**. You may customize the port number by editing this field. Click the button **Default** to restore to default.
SMTP User Name / Password	This setting specifies the SMTP username and password while sending email. These options are shown only if **Require authentication** check box is checked in SMTP Server setting.
Confirm SMTP Password	This field allows you to verify and confirm the new administrator password.
Sender's Email Address	This setting specifies the sender email address reported by the email messages sent by the Pepwave MAX.
Recipient's Email Address	This setting specifies the email addresses to which the Pepwave MAX should send the email messages to. You may enter multiple recipients' email addresses in this field.

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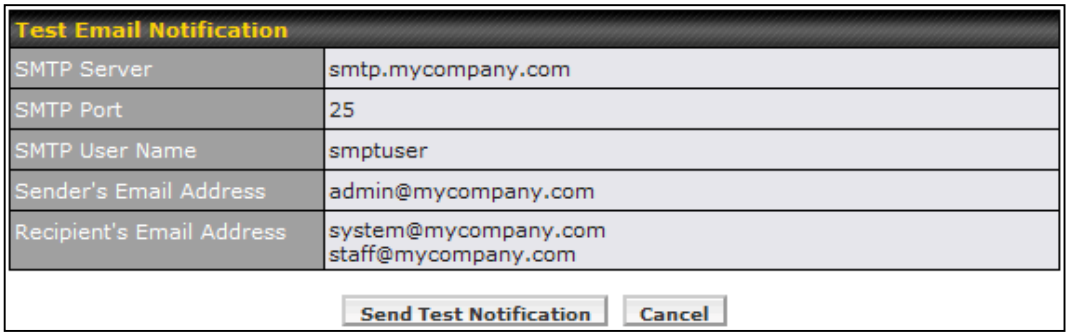
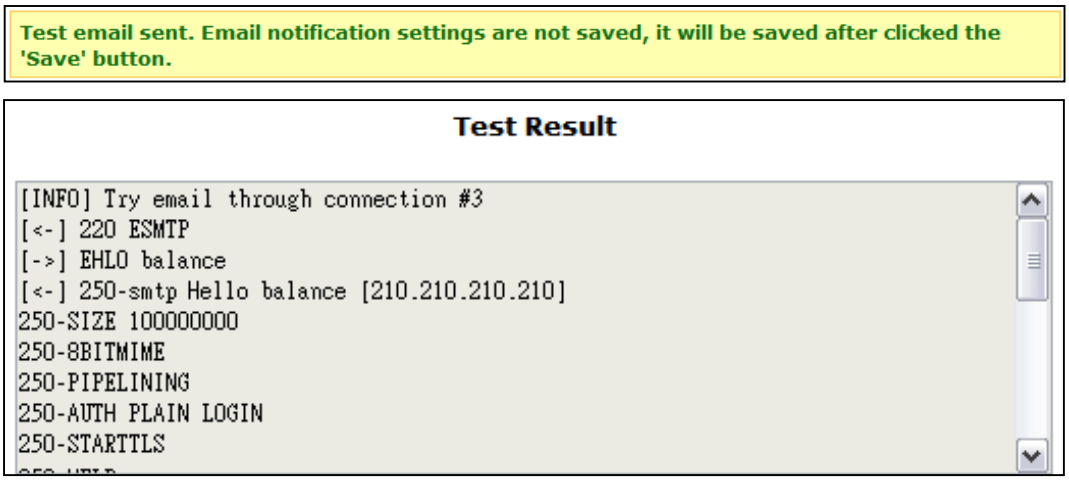
After you have completed the settings, you can click the **Test Email Notification** button to test the settings before saving it. After it is clicked, you will see this screen to confirm the settings:



Test Email Notification	
SMTP Server	smtp.mycompany.com
SMTP Port	25
SMTP User Name	smptuser
Sender's Email Address	admin@mycompany.com
Recipient's Email Address	system@mycompany.com staff@mycompany.com

Send Test Notification | Cancel

Click **Yes** to confirm. Wait a few seconds, and you will see a return message and the detailed test result.



Test email sent. Email notification settings are not saved, it will be saved after clicked the 'Save' button.

Test Result

```
[INFO] Try email through connection #3
[<-] 220 ESMTP
[->] EHLO balance
[<-] 250-smtp Hello balance [210.210.210.210]
250-SIZE 100000000
250-8BITMIME
250-PIPELINING
250-AUTH PLAIN LOGIN
250-STARTTLS
```

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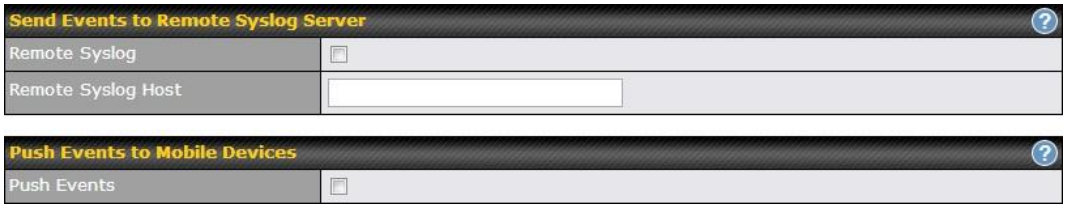
21.5 Event Log

The Remote Syslog functionality of the Pepwave MAX enables event logging at a specified remote Syslog server.

The settings for configuring Remote System Log are found at ***System> Event Log***:



Remote Syslog Settings	
Remote Syslog	Remote Syslog allows syslog message to be sent to a specified remote syslog server. You can configure a remote syslog host either in the form of an IP address or a server domain name.
Remote Syslog Host	This setting specifies the IP address or host name of the remote Syslog server.
Port	This setting specifies the port number of the remote Syslog service. By default, the Port setting has value is **514**.

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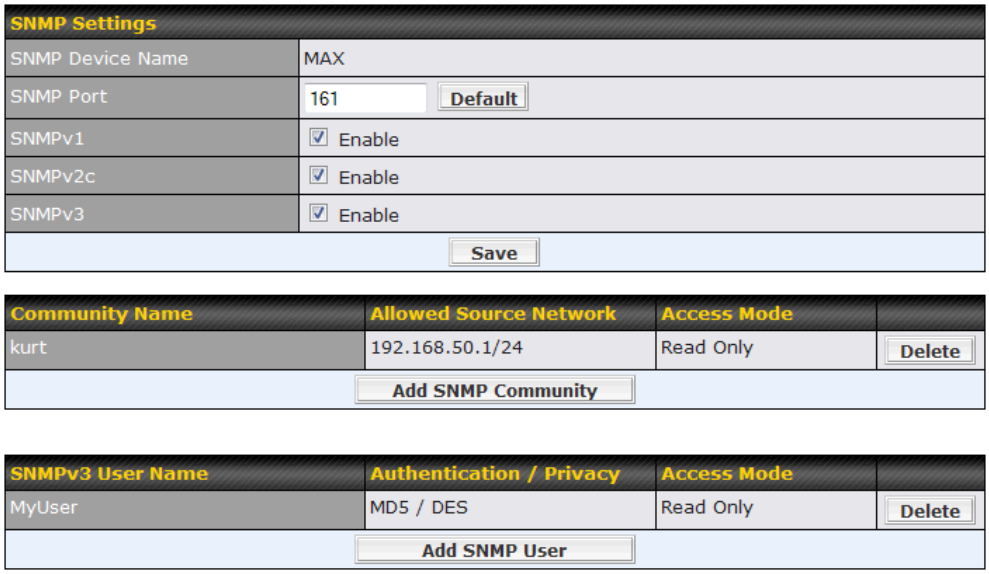
21.6 SNMP

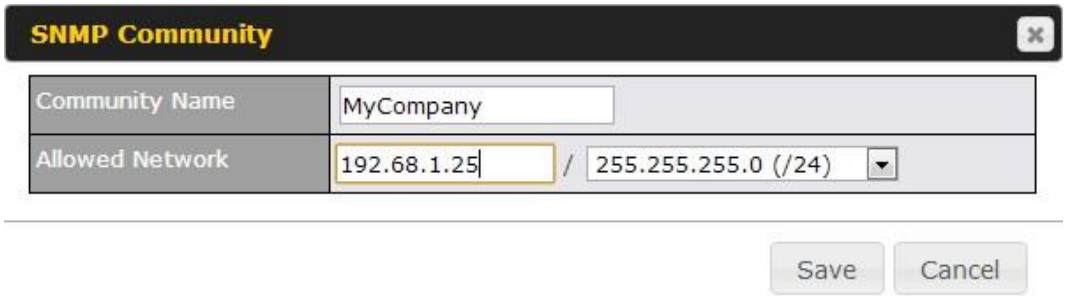
SNMPor Simple Network Management Protocol is an open standard that can be used to collect information from the Pepwave MAX Mobile Router.

SNMP configuration is located at ***System> SNMP***:



SNMP Settings	
SNMP Device Name	This field shows the router name defined in ***System > Admin Security***.
SNMP Port	This option specifies the port which SNMP used. The default port is set as **161**.
SNMPv1	This option allows you to enable SNMP version 1.
SNMPv2	This option allows you to enable SNMP version 2.
SNMPv3	This option allows you to enable SNMP version 3.

To add a community for either SNMPv1 or SNMPv2, click the **Add SNMP Community** button in the **Community Name** table, upon which the following screen will be displayed:



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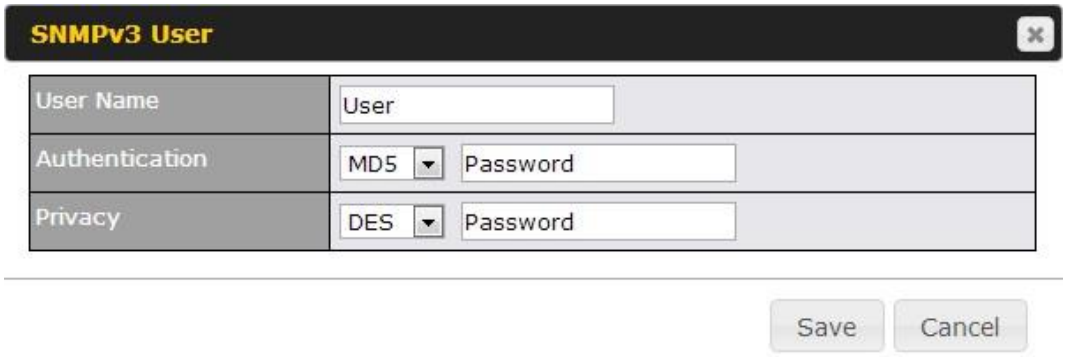
SNMP Community Settings	
Community Name	This setting specifies the SNMP Community Name.
Allowed Source Subnet Address	This setting specifies a subnet from which access to the SNMP server is allowed. Enter subnet address here (e.g. 192.168.1.0), and specify your subnet mask using the pull-down menu.

To define a user name for SNMPv3, click **Add SNMP User** in the **SNMPv3 User Name** table, upon which the following screen is displayed:



SNMPv3 User Settings	
User Name	This setting specifies a user name to be used in SNMPv3.
Authentication Protocol	This setting specifies via a drop-down menu the one of the following valid authentication protocols: • NONE • MD5 • SHA Specify your password on the field to the right.
Privacy Protocol	This setting specifies via a drop-down menu the one of the following valid privacy protocols: • NONE • DES Specify your password on the field to the right.

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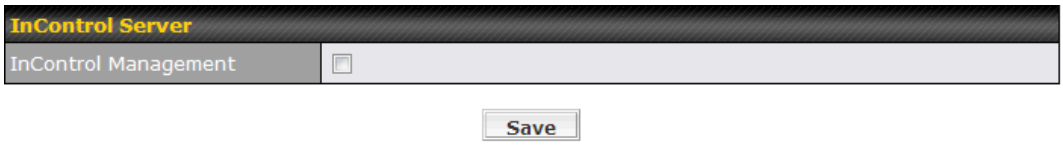
21.7 InControl



When this check box is checked, the device's status information, usage data, and configuration will be sent to Pepwave's InControl system. You can sign up for an InControl account athttps://incontrol.pepwave.com/ . You can register devices under the account, monitor device status and usage reports, and download backed up configuration files.

Default: Disabled

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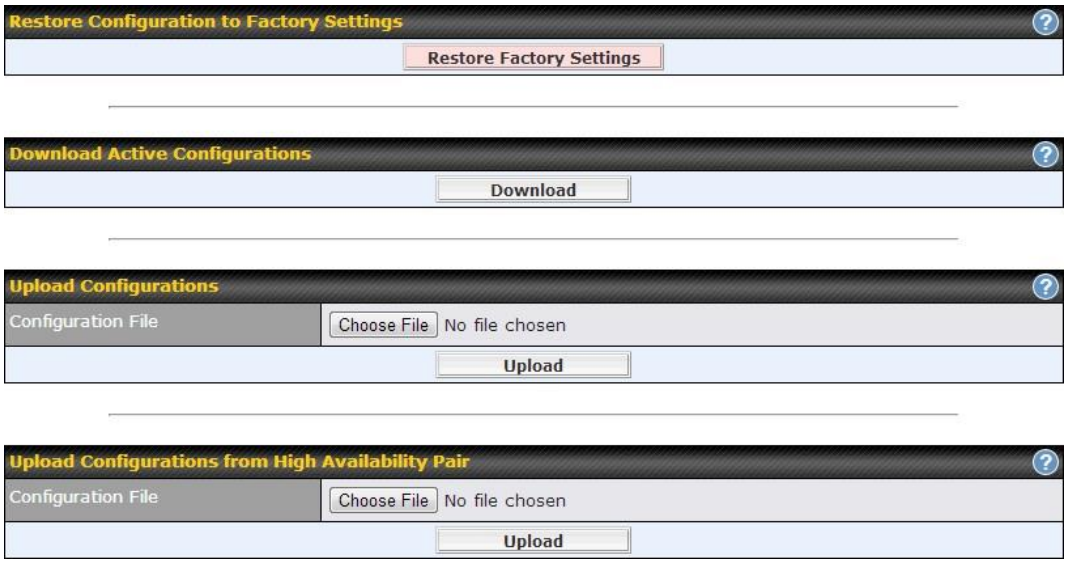
21.8 Configuration

Backing up the Pepwave MAX settings immediately after successful completion of the initial setup is strongly recommended.

The functionality to download and upload Pepwave MAX settings is found at ***System> Configuration***



Configuration	
Restore Configuration to Factory Settings	The **Restore Factory Settings** button is to reset the configuration to the factory default settings. After clicking the button, you will need to click the **Apply Changes** button on the top right corner to make the settings effective.
Downloading Active Configurations	The purpose of the **Download** button is to backup the current active settings. Click **Download** and save the configuration file.
Uploading Configurations	To restore or change settings based on a configuration file, click **Choose File** to locate the configuration file on the local computer, and then click **Upload**. The new settings can then be applied by clicking the **Apply Changes** button on the page header, or you can cancel the procedure by pressing **discard** on the Main page of Web Admin Interface.
Uploading Configuration from High Availability Pair	**(Available on Pepwave MAX HD2 and MAX 700)** In a High Availability (HA) configuration, the MAX router can quickly load the configuration of its HA counterpart. To do so, click the **Upload** button. After loading the settings, configure the LAN IP address of the MAX router to be different from the HA counterpart.

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21.9 Feature Add-ons

Some MAX routers have features that could be activated upon purchase. Once the purchase is complete, you will receive an Activation Key. Enter the key on the **Activation Key** field, click **Activate**, and then click **Apply Changes**.

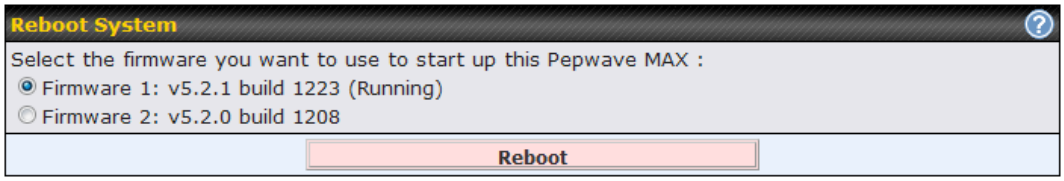
21.10 Reboot

This page provides a Reboot button for restarting the system.

For highest reliability, the Pepwave MAX is equipped with two copies of firmware of different version. You can select the firmware version you would like the device to reboot with.

The firmware marked with **(Running)** is the current system boot up firmware.

Please note that a firmware upgrade will always replace the inactive firmware partition.


Reboot System
Select the firmware you want to use to start up this Pepwave MAX :
Firmware 1: v5.2.1 build 1223 (Running)
Firmware 2: v5.2.0 build 1208
Reboot

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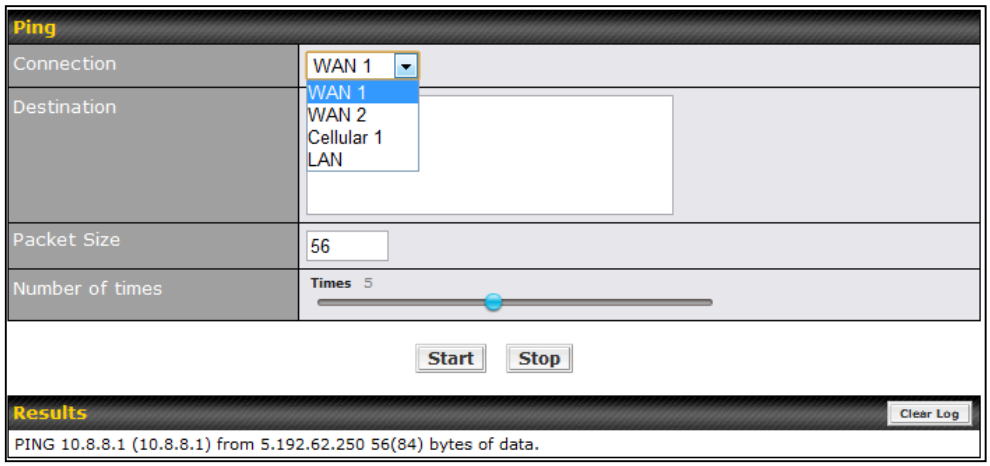
21.11 Ping Test

The Ping Test tool in the Pepwave MAX performs Pings through a specified Ethernet interface or a SpeedFusion™ connection. You can specify the number of pings in the field **Number of times** to a maximum of 10 times, and Packet Size can be specified in the field **Packet Size** to a maximum of **1472** bytes.

The Ping utility is located at ***System > Tools > Ping,*** illustrated as follows:



Tip

A system administrator can use the Ping utility to manually check the connectivity of a particular LAN/WAN connection.

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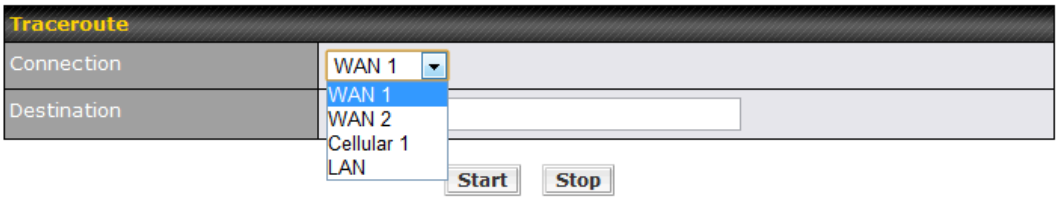
21.12 Traceroute Test

The Traceroute Test tool in the Pepwave MAX traces the routing path to the destination through a particular Ethernet interface or SpeedFusion™ connection.

The Traceroute Test utility is located at ***System > Tools > Traceroute***, illustrated as follows:

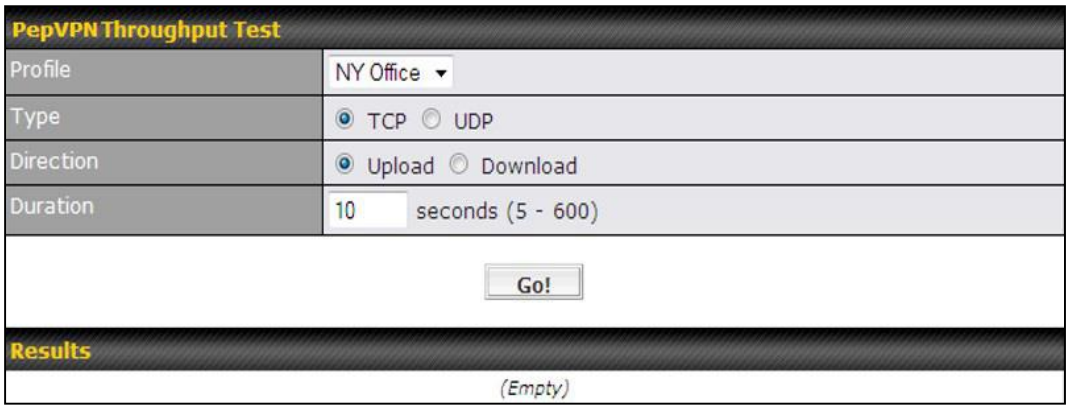


Tip

A system administrator can use the Traceroute utility to analyze the connection path of a LAN/WAN connection.

21.13 PepVPN Test

The PepVPN Test tool can help to test the throughput between different VPN peers.
You can define the **Test Type**, **Direction**, and **Duration** of the test, and press **Go!** to perform the throughput test. The VPN Test utility is located at ***System > Tools >PepVPN Test*** illustrated as follows:



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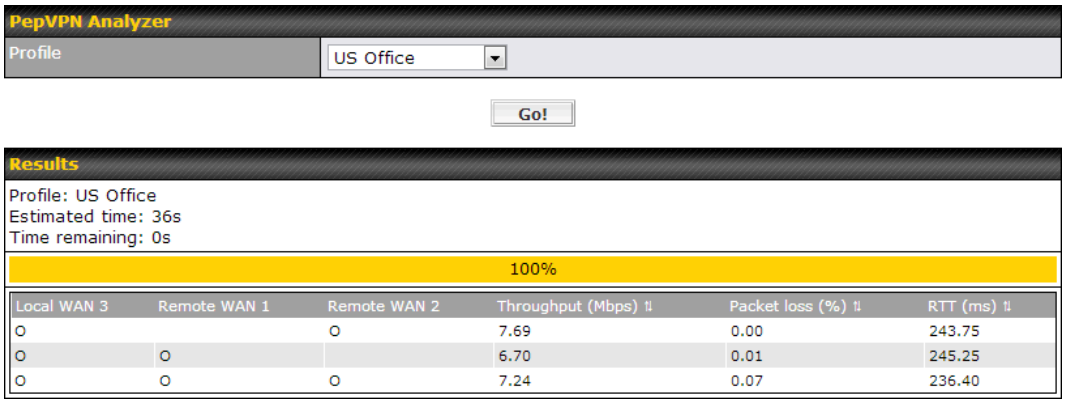
21.14 PepVPN Analyzer

The bandwidth bonding feature of PepVPN occurs when multiple WAN lines from one end merge with multiple WAN lines from the other end. For this to happen, each WAN line needs to form a connection with all the WAN lines on the opposite end. The function of the PepVPN Analyzer is to report the throughput, packet loss, and latency of all possible combinations of *connections*.

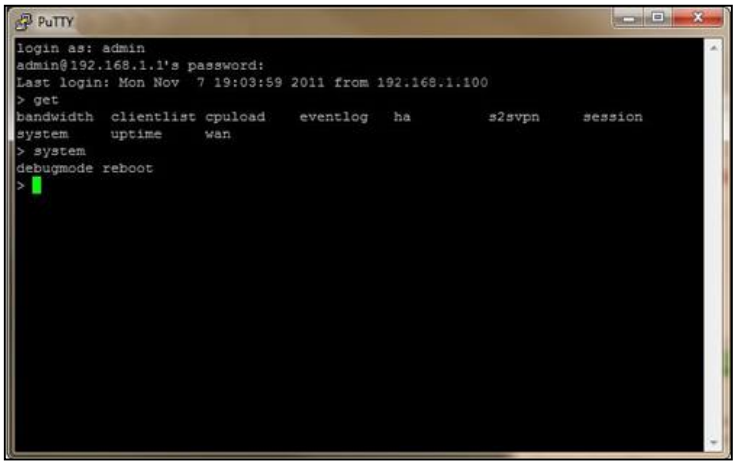
This feature is located in **System > PepVPN Analyzer**. To utilize this feature, simply choose your profile from the drop-down menu and click **Go!**



21.15 CLI (Command Line Interface Support)

The CLI (Command Line Interface) can be accessed via SSH. This field enables CLI support.

The below settings specify which TCP port and which interface(s) should accept remote SSH CLI access. The user name and password used for remote SSH CLI access are the same as those used for web admin access.



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22 Status

This section displays the information of the Pepwave MAX on the ***Device***, ***ActiveSessions, Client List, WINS Client List,*****SpeedFusion™*****,UPnP / NAT-PMP***,***Event Log***, and ***Bandwidth***.

22.1 Device

System information is located at ***Status>Device***:

System Information	
Router Name	MAX_HD2_DEF1
Model	Pepwave MAX HD2
Hardware Revision	2
Serial Number	2830-A2D4-DEF1
Firmware	6.1.0 build 2472
PepVPN Version	3.0.0
Modem Support Version	1014 (Modem Support List)
Host Name	max-hd2-def1
Uptime	1 day 11 minutes
System Time	Fri Jan 03 09:20:45 WET 2014
Diagnostic Report	Download

System Information	
Router Name	This is the name specified in the field Router Name located in ***System > Admin Security***.
Model	This shows the model name and number of this device.
Hardware Revision	This shows the hardware version of this device.
Serial Number	This shows the serial number of this device.
Firmware	This shows the firmware version that this device is currently running.
Modem Support Version	This shows the modem support version of this device. A Modem Support List link redirects users to a list of cellular modems supported by this device.
Uptime	This shows the length of time since the device is rebooted.
System Time	This shows the current system time.
GPX File (HD2 and HD2 IP67 Only)	This contains the GPS data of the latest 7 days. A Download button is for exporting the data in GPX format of the selected date. For more information about how GPS works in HD2 and HD2 IP67, please refer to section 19.1.1.
Diagnostic Report	A **Download** button is for exporting a diagnostic report file required for system investigation.

Interface	MAC Address
LAN Port	00:1A:DD:BD:1D:80
WAN 1	00:1A:DD:BD:1D:81
WAN 2	00:1A:DD:BD:1D:82

The second table shows the MAC address of each LAN/WAN interface connected.

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To view this you device's End User License Agreement (EULA), please click on the icon.

Important Note
If you encounter issues and would like to contact Pepwave Support Team (http://www.pepwave.com/contact/), please download the diagnostic report file and attach it along with a description of your encountered issue. In firmware 5.1 or before, Diagnostic Report file can be obtained at ***System > Reboot***

22.1.1 GPS Data

The MAX HD2 and HD2 IP67 automatically stores up to seven days of GPS location data in GPS eXchange format (GPX). To review this data using third-party applications, click ***Status > Device*** and then download your GPX file.

The Pepwave MAX BR1, HD2 and HD2 IP67 export real-time location data in NMEA format through its LAN IP address at TCP port 60660. It is accessible from LAN or over a SpeedFusion connection. To access the data via a virtual serial port, you have to install a virtual serial port driver. Visit http://www.peplink.com/index.php?view=faq&id=294 to download the driver.

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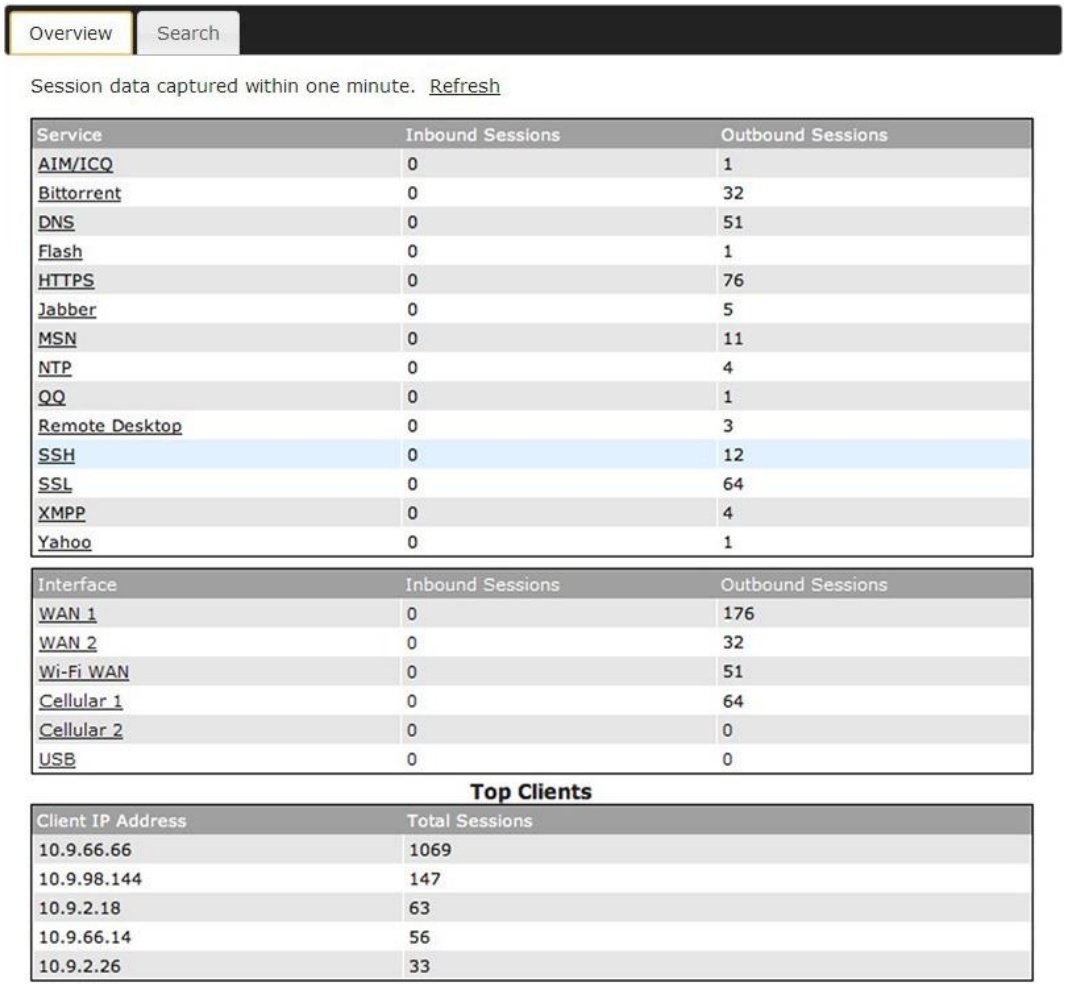
22.2 Active Sessions

Information on Active Sessions is at ***Status> Active Sessions> Overview***



Service	Inbound Sessions	Outbound Sessions
AIM/ICQ	0	1
Bittorrent	0	32
DNS	0	51
Flash	0	1
HTTPS	0	76
Jabber	0	5
MSN	0	11
NTP	0	4
QQ	0	1
Remote Desktop	0	3
SSH	0	12
SSL	0	64
XMPP	0	4
Yahoo	0	1

Interface	Inbound Sessions	Outbound Sessions
WAN 1	0	176
WAN 2	0	32
Wi-Fi WAN	0	51
Cellular 1	0	64
Cellular 2	0	0
USB	0	0

Top Clients

Client IP Address	Total Sessions
10.9.66.66	1069
10.9.98.144	147
10.9.2.18	63
10.9.66.14	56
10.9.2.26	33

This screen displays the number of sessions initiated by each application. Click on each Service to obtain additional information. This screen also indicates the number of sessions initiated by each WAN port. Finally, you can see which clients are initiating the most sessions.

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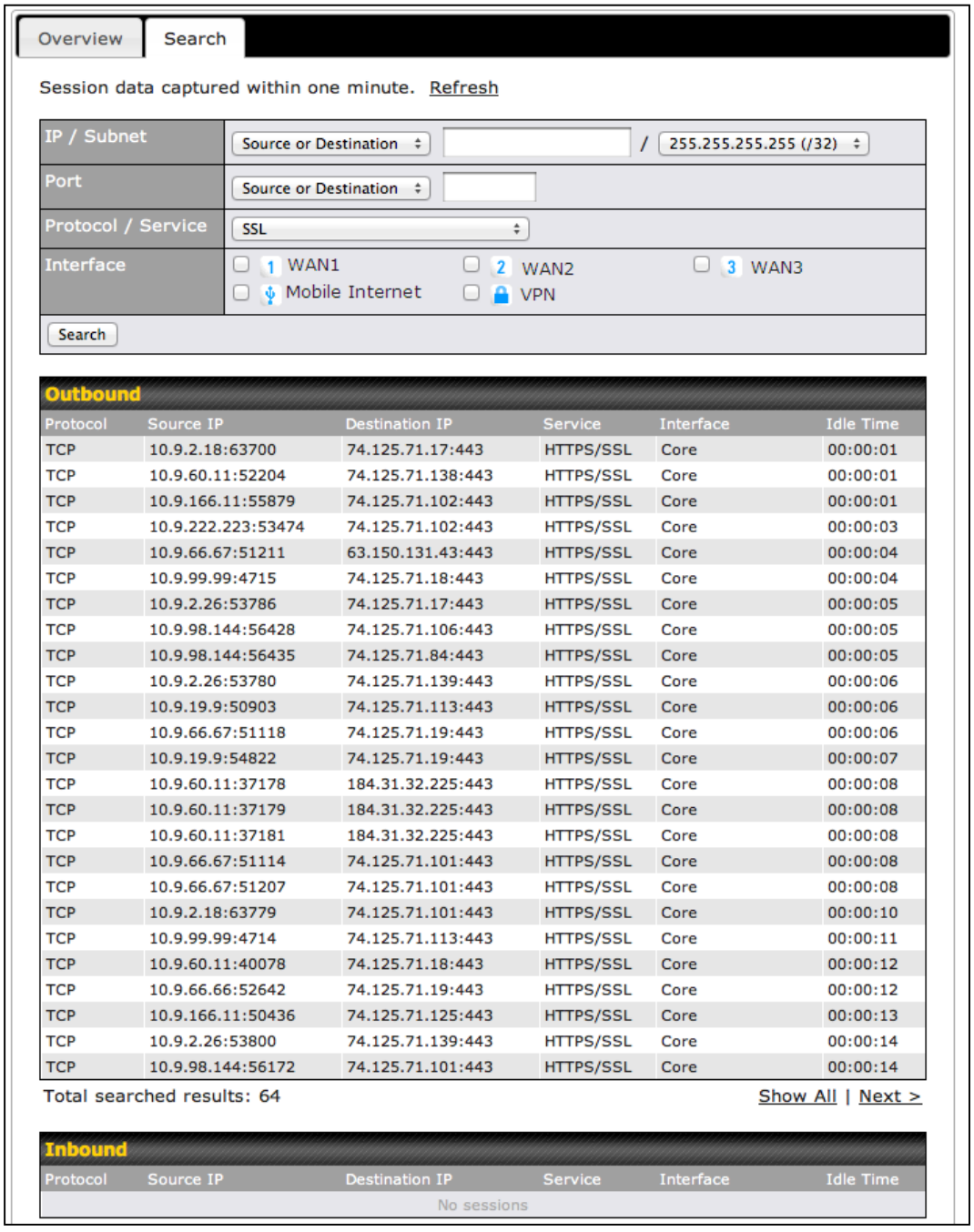
In addition, you can also perform a filtered search for specific sessions. You can filter by subnet, port, protocol, and interface. To perform a search, navigate to: ***Status > Active Sessions> Search***



This Active Sessions section displays the active inbound / outbound and UDP / TCP sessions of each WAN connection on the Pepwave MAX.

A filter is available to help sort out the active session information. Enter a keyword in the field or check one of the WAN connection boxes for filtering.

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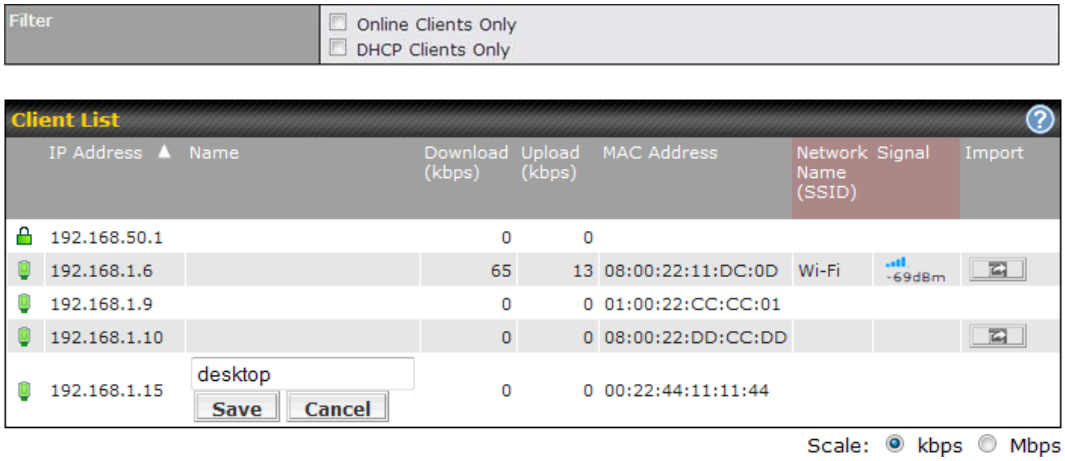
22.3 Client List

The client list table is located at ***Status > Client List***. It lists DHCP client IP addresses, their Names (retrieved from DHCP reservation table or defined by users), current **Download and Upload rate** and MAC addresses that the Pepwave MAX has offered IP addresses to since it is powered up.Network Name (SSID) and Signal refers to the information about Wi-Fi AP, which is the name of the Network and its signal strength. Clients can be imported into DHCP Reservation table by clicking the button on the right-most column. Further update the record after the import by going to ***Network > LAN***.

If PPTP Server in section 19.2 is enabled, you may see the corresponding connection name would be listed in the field of **Name**.



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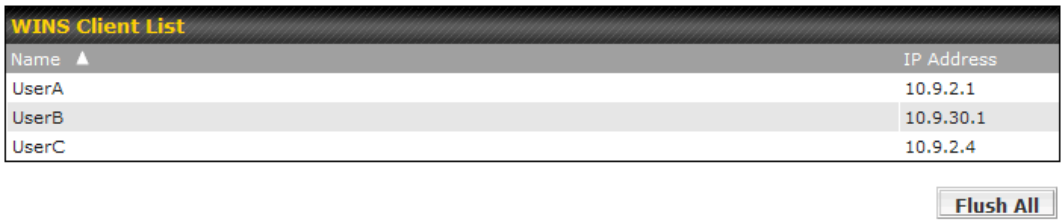
22.4 WINS Client

The WINS client list table is located at ***Status >WINS Client***. It lists WINS client IP addresses and their Names. This option will only be available when you have enabled the WINS Server in section 8.1.

Name of clients retrieved will be automatically matched into Client List in the previous section.

Click the button **Flush All** to flush all WINS client records.



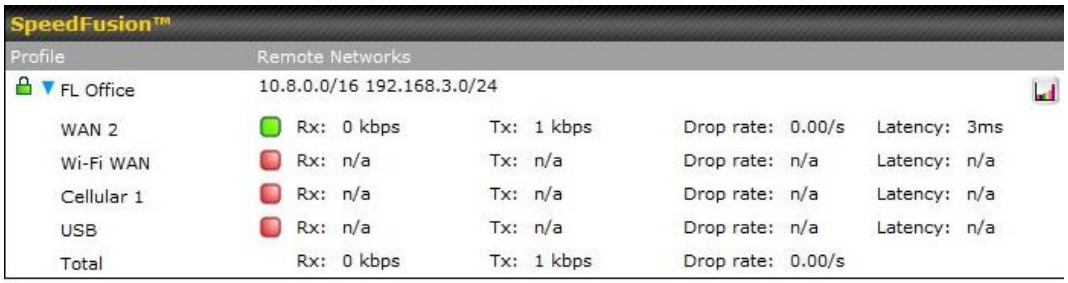
WINS Client List	
Name ▲	IP Address
UserA	10.9.2.1
UserB	10.9.30.1
UserC	10.9.2.4

Flush All

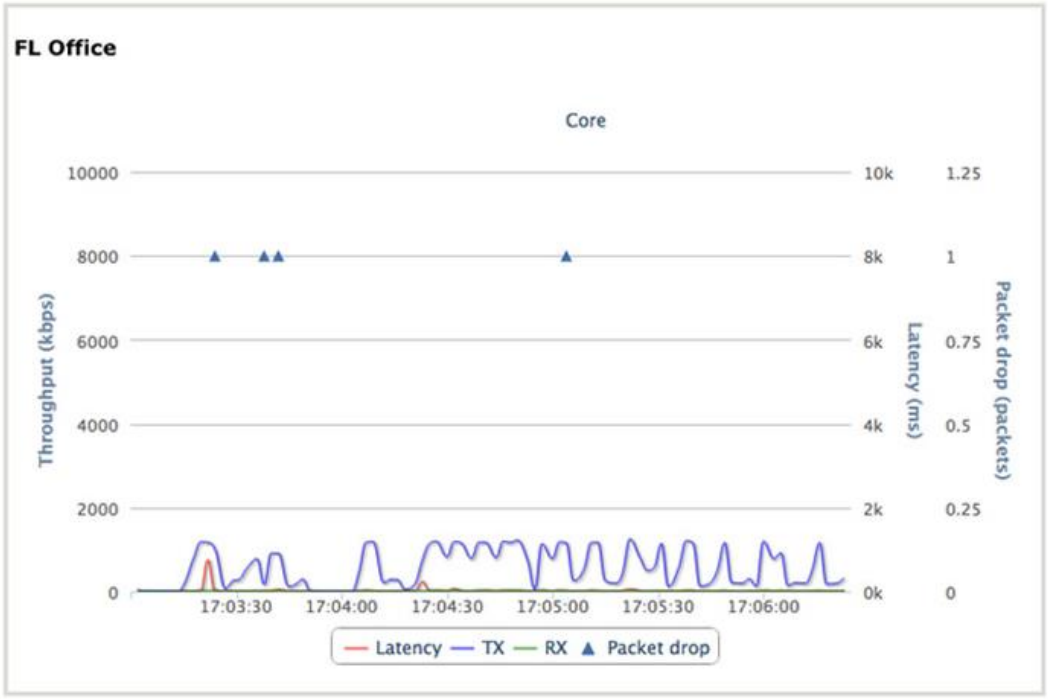
22.5 SpeedFusion™

This is a page showing the current status of SpeedFusion™, located at: ***Status >SpeedFusion™***

Details about peer's WAN connections are listed as below.



SpeedFusion™								
Profile	Remote Networks							
FL Office	10.8.0.0/16 192.168.3.0/24							
WAN 2	Rx:	0 kbps	Tx:	1 kbps	Drop rate:	0.00/s	Latency:	3ms
Wi-Fi WAN	Rx:	n/a	Tx:	n/a	Drop rate:	n/a	Latency:	n/a
Cellular 1	Rx:	n/a	Tx:	n/a	Drop rate:	n/a	Latency:	n/a
USB	Rx:	n/a	Tx:	n/a	Drop rate:	n/a	Latency:	n/a
Total	Rx:	0 kbps	Tx:	1 kbps	Drop rate:	0.00/s		



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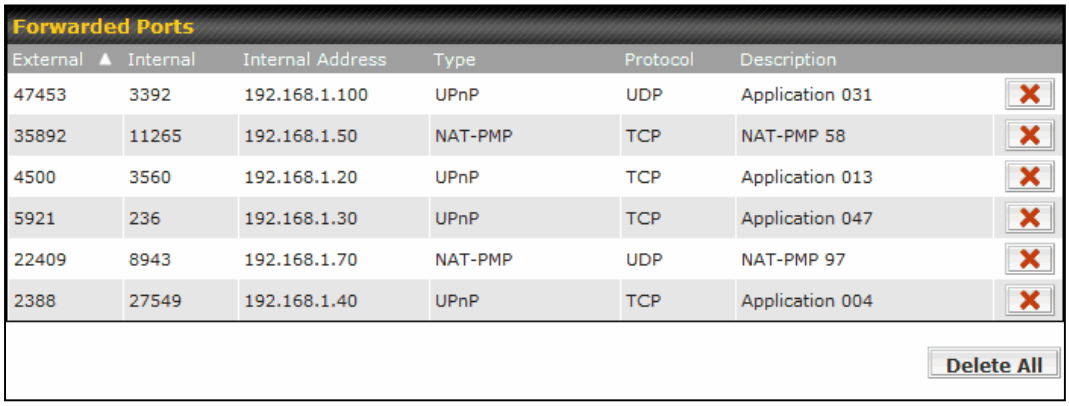
22.6 UPnP / NAT-PMP

The table that shows the forwarded ports under UPnP and NAT-PMP protocols is located at ***Status > UPnP / NAT-PMP***:

This section appears only if you have enabled the function of UPnP / NAT-PMP as mentioned in Section15.1.1



Forwarded Ports

External ▲	Internal	Internal Address	Type	Protocol	Description	
47453	3392	192.168.1.100	UPnP	UDP	Application 031	✖
35892	11265	192.168.1.50	NAT-PMP	TCP	NAT-PMP 58	✖
4500	3560	192.168.1.20	UPnP	TCP	Application 013	✖
5921	236	192.168.1.30	UPnP	TCP	Application 047	✖
22409	8943	192.168.1.70	NAT-PMP	UDP	NAT-PMP 97	✖
2388	27549	192.168.1.40	UPnP	TCP	Application 004	✖

Delete All

Click the button ✖ to delete a single UPnP / NAT-PMP record in its corresponding row. To delete all records, click **Delete All** on the right-hand side below the table.

Important Note

UPnP / NAT-PMP records would be deleted immediately after clicking the button ✖ or **Delete All** without the need to click Save or Confirm.

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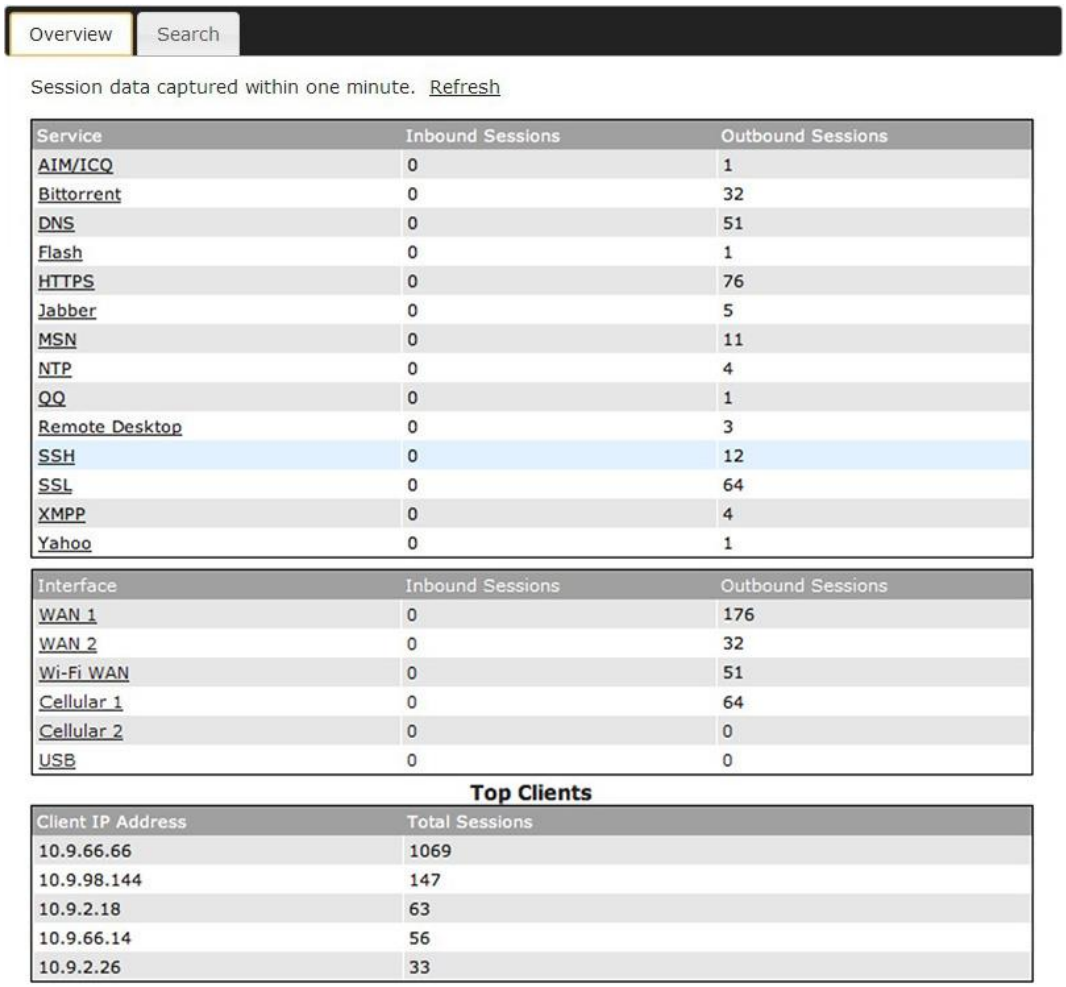
22.7 Event Log

Event Log information is located at ***Status>Event Log***:



Service	Inbound Sessions	Outbound Sessions
AIM/ICQ	0	1
Bittorrent	0	32
DNS	0	51
Flash	0	1
HTTPS	0	76
Jabber	0	5
MSN	0	11
NTP	0	4
QQ	0	1
Remote Desktop	0	3
SSH	0	12
SSL	0	64
XMPP	0	4
Yahoo	0	1

Interface	Inbound Sessions	Outbound Sessions
WAN 1	0	176
WAN 2	0	32
Wi-Fi WAN	0	51
Cellular 1	0	64
Cellular 2	0	0
USB	0	0

Top Clients

Client IP Address	Total Sessions
10.9.66.66	1069
10.9.98.144	147
10.9.2.18	63
10.9.66.14	56
10.9.2.26	33

The log section displays a list of events that has taken place on the Pepwave MAX unit. Click the Auto **Refresh** to retrieve log entries again. Click the **Clear Log** button Clear Log to clear the log.

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22.8 Bandwidth

This section shows the bandwidth usage statistics, located at:***Status > Bandwidth***

Bandwidth usage at the LAN and when the device is switched off, bandwidth usage is not recorded and not shown.

22.8.1 Real-Time

The **Data transferred since installation** shows you how many network traffic has been processed by your device since first boot.

Click **Show Details** in the top right hand corner of each table and the details of data transferred will be shown.

The check box **Stacked** below the data transferred graph can be checked to show the aggregated transferred rate of both traffic directions.

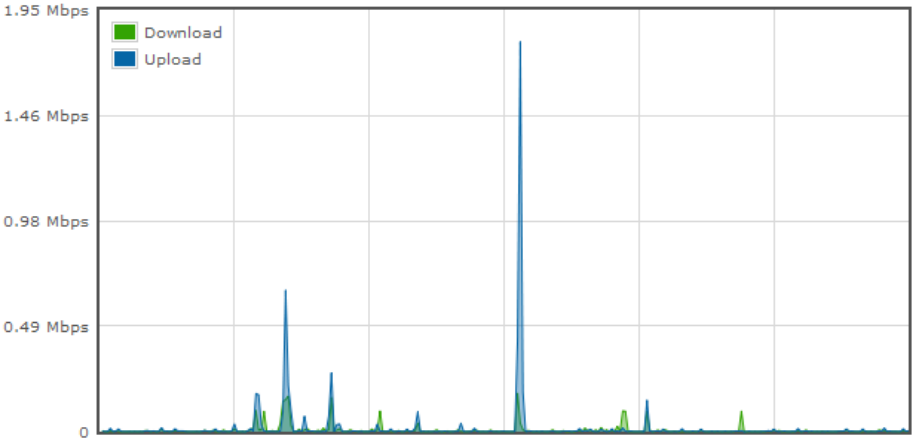
Data transferred since installation (Tue Oct 12 23:11:14 PST 2010)

	Download	Upload	Total
All WAN Connections	10.63 GB	12.99 GB	23.62 GB

Data transferred since last reboot [Hide Details]

	Download	Upload	Total
All WAN Connections	224 MB	178 MB	402 MB
Ethernet WAN	212 MB	175 MB	387 MB
Express Card	0 MB	0 MB	0 MB
PC Card	0 MB	0 MB	0 MB
USB1	0 MB	0 MB	0 MB
USB2	0 MB	0 MB	0 MB
Wi-Fi WAN	12 MB	3 MB	15 MB

Aggregated Transfer



Avg: 0.01 Mbps 0.02 Mbps Peak: 0.18 Mbps 1.80 Mbps Stacked

	Download	Upload	Total
Overall	4 kbps	5 kbps	9 kbps

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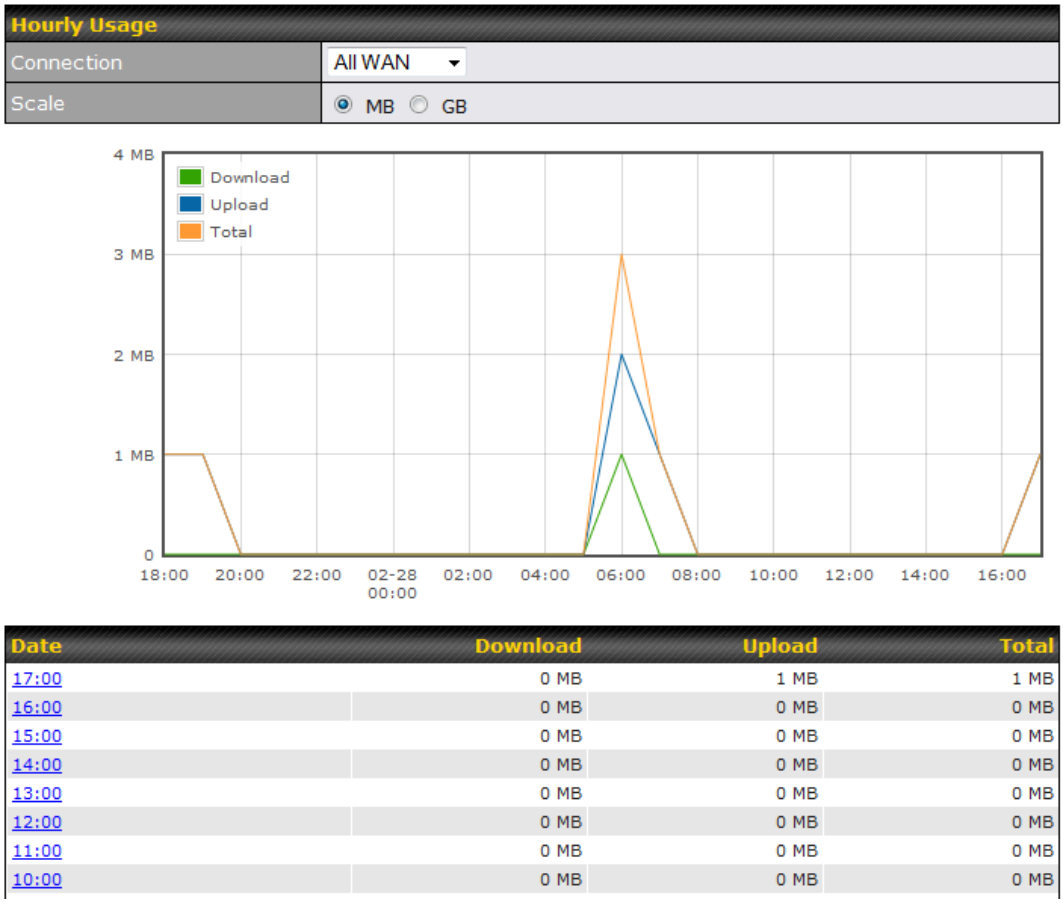
22.8.2 Hourly

This page shows the daily bandwidth usage for all and each WAN connection.

Select the connection in which you want to check its usage from the drop down menu



Date	Download	Upload	Total
17:00	0 MB	1 MB	1 MB
16:00	0 MB	0 MB	0 MB
15:00	0 MB	0 MB	0 MB
14:00	0 MB	0 MB	0 MB
13:00	0 MB	0 MB	0 MB
12:00	0 MB	0 MB	0 MB
11:00	0 MB	0 MB	0 MB
10:00	0 MB	0 MB	0 MB

22.8.3 Daily

This page shows the daily bandwidth usage for all and each WAN connection.

Select the connection in which you want to check its usage from the drop down menu. If you have enabled **Bandwidth Monitoring** feature as shown in section9.5, the **Current Billing Cycle** table for that WAN connection will be displayed.

Click on a date to view the client bandwidth usage of that specific date. This feature is not available if you have selected to view the bandwidth usage of only a particular WAN connection.

The Scale of the graph can be set to show in **Megabyte (MB)** or **Gigabyte (GB)**.

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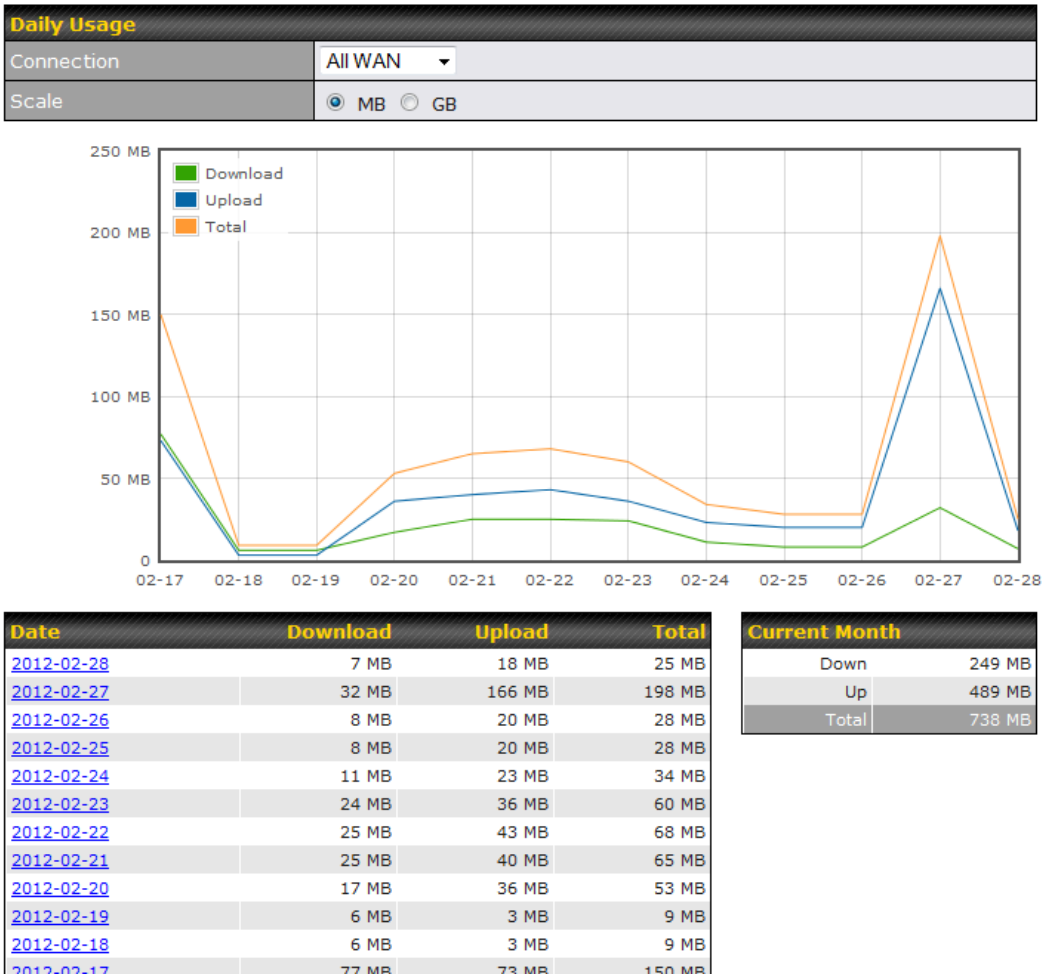

Date	Download	Upload	Total
2012-02-28	7 MB	18 MB	25 MB
2012-02-27	32 MB	166 MB	198 MB
2012-02-26	8 MB	20 MB	28 MB
2012-02-25	8 MB	20 MB	28 MB
2012-02-24	11 MB	23 MB	34 MB
2012-02-23	24 MB	36 MB	60 MB
2012-02-22	25 MB	43 MB	68 MB
2012-02-21	25 MB	40 MB	65 MB
2012-02-20	17 MB	36 MB	53 MB
2012-02-19	6 MB	3 MB	9 MB
2012-02-18	6 MB	3 MB	9 MB
2012-02-17	77 MB	73 MB	150 MB

Current Month	
Down	249 MB
Up	489 MB
Total	738 MB

All WAN Daily Bandwidth Usage

22.8.4 Monthly

This page shows the monthly bandwidth usage for each WAN connection.

If you have enabled **Bandwidth Monitoring** feature as shown in section9.5, you can choose a particular connection to check its usage and select to show the monthly usage period in **Billing Cycle** or **Calendar Month**.

Click the first or second row to view the client bandwidth usage of the current month.This feature is not available if you have chosen to view the bandwidth usage of only a particular WAN connection.

The Scale of the graph can be set to show in **Megabyte (MB)** or **Gigabyte (GB)**.

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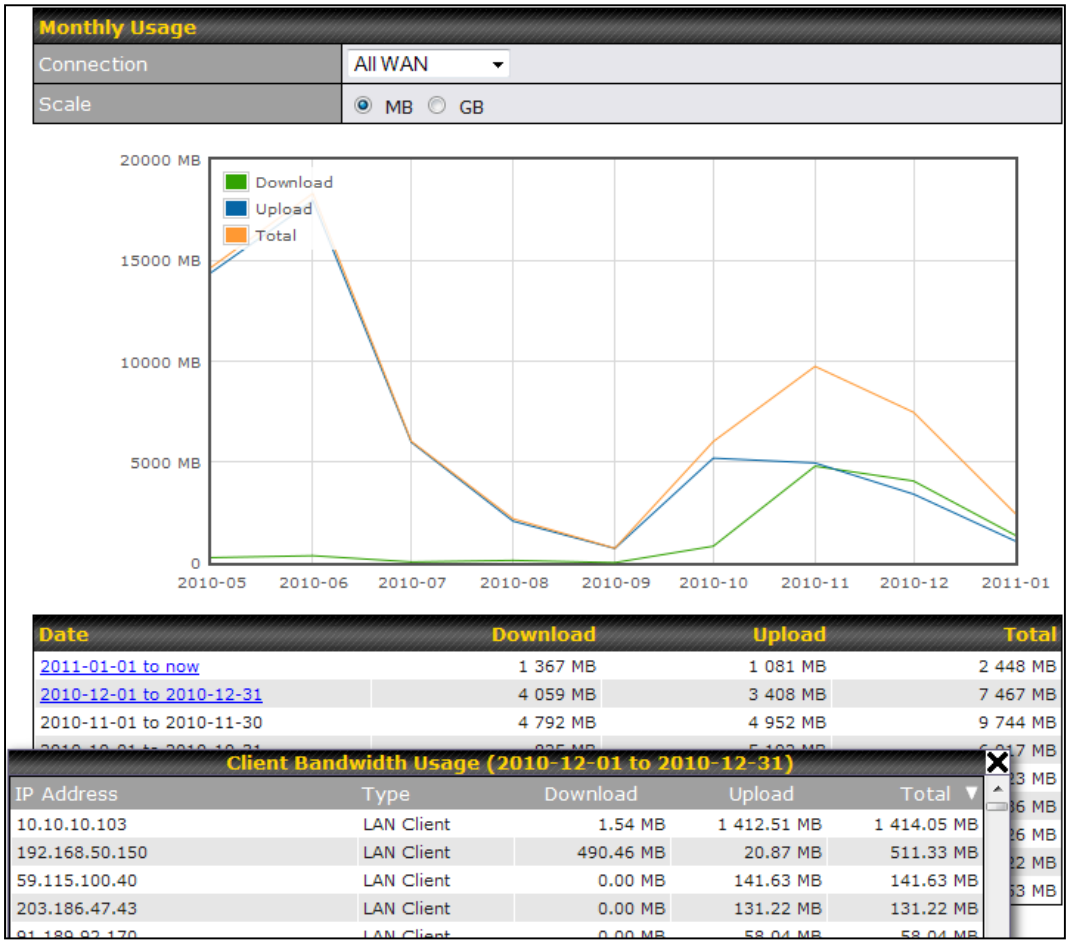

All WAN Monthly Bandwidth Usage

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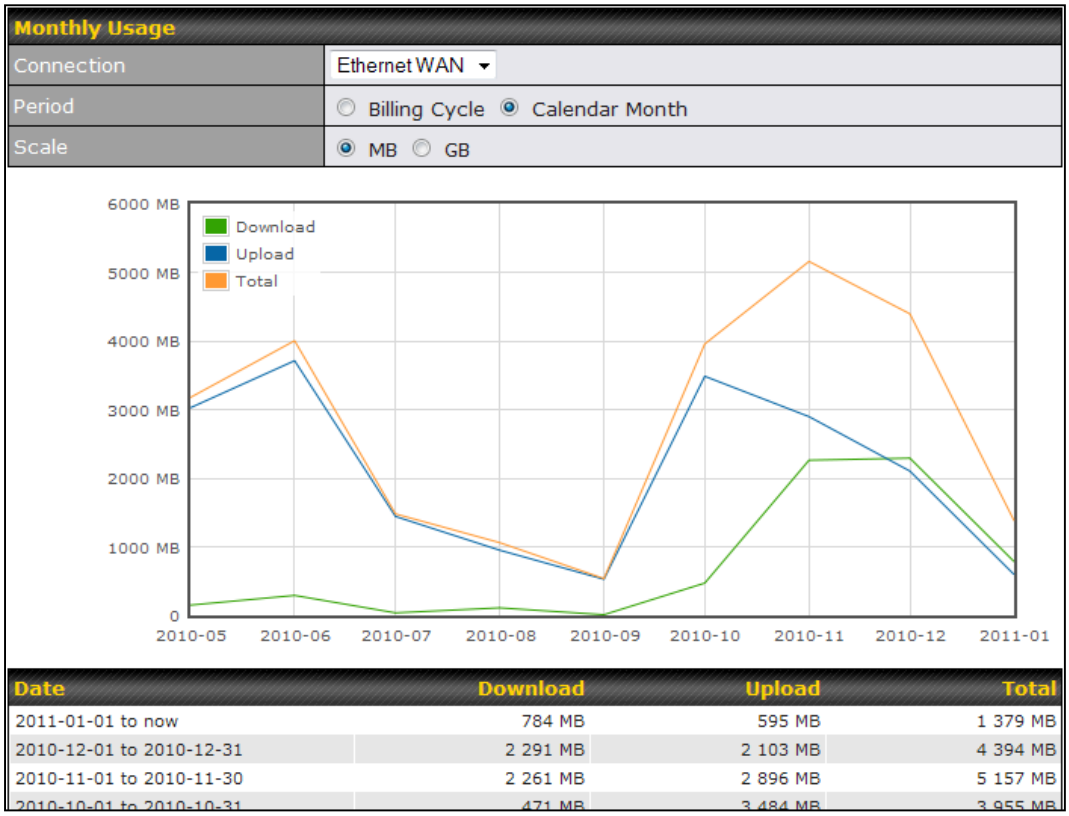

Ethernet WAN Monthly Bandwidth Usage

Tip

By default, the scale of data size is in **MB**. 1GB equals to 1024MB.

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Appendix A. Restoration of Factory Defaults

To restore the factory default settings on a Pepwave MAX unit, follow the steps below:

1. Locate the reset button on the front panel ofPepwave MAX unit.
2. With a paper clip, press the reset button and hold it for at least 10 seconds until the unit reboots itself.

After the Pepwave MAX finishes rebooting, the factory default settings will be restored.

Important Note
All previous configurations and bandwidth usage data will be lost after restoring the factory default settings. Regular backup of configuration settings is strongly recommended.

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Appendix B. Declaration

1. The device supports time division technology

2. Federal Communication Commission Interference Statement for MAX700 / HD2/ HD2 IP67 / BR1

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1) Reorient or relocate the receiving antenna.
2) Increase the separation between the equipment and receiver.
3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4) Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

IMPORTANT NOTE

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

3. CE Statement for MAX BR1

Europe – EU Declaration of Conformity

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This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

- EN 60950-1: 2006 + A11 : 2009+A1 : 2010+ A12: 2011
  Safety of Information Technology Equipment

- EN50385 : 2002 / Article 3(1)(a)
  Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110MHz - 40 GHz) - General public

  EN 300 328 V1.7.1: 2006
  Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

- EN 301 908-1 V5.2.1: 2011
  Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 Third-Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive

- EN 301 511 V9.0.2: 2003
  Global System for Mobile communications (GSM); Harmonized standard for mobile stations in the GSM 900 and DCS 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC)

- EN 301 489-1 V1.9.2: 2008
  Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

- EN 301 489-7 V1.3.1: 2005
  ElectroMagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment ad services; Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)

- EN 301 489-17 V2.2.1: 2012
  Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

- EN 301 489-24 V1.5.1: 2010
  Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment

CE 0081

cs Česky [Czech]	*[Jméno výrobce]* tímto prohlašuje, že tento *[typ zařízení]* je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
da Dansk [Danish]	Undertegnede *[fabrikantens navn]* erklærer herved, at følgende udstyr *[udstyrets typebetegnelse]* overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

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de Deutsch [German]	Hiermit erklärt *[Name des Herstellers]*, dass sich das Gerät *[Gerätetyp]* in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
et Eesti [Estonian]	Käesolevaga kinnitab *[tootja nimi = name of manufacturer]* seadme *[seadme tüüp = type of equipment]* vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
en English	Hereby, *[name of manufacturer]*, declares that this *[type of equipment]* is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
es Español [Spanish]	Por medio de la presente *[nombre del fabricante]* declara que el *[clase de equipo]* cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
el Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ *[name of manufacturer]* ΔΗΛΩΝΕΙ ΟΤΙ *[type of equipment]* ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
fr Français [French]	Par la présente *[nom du fabricant]* déclare que l'appareil *[type d'appareil]* est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
it Italiano [Italian]	Con la presente *[nome del costruttore]* dichiara che questo *[tipo di apparecchio]* è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo *[name of manufacturer / izgatavotāja nosaukums]* deklarē, ka *[type of equipment / iekārtas tips]* atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo *[manufacturer name]* deklaruoja, kad šis *[equipment type]* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
nl Nederlands [Dutch]	Hierbij verklaart *[naam van de fabrikant]* dat het toestel *[type van toestel]* in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
mt Malti [Maltese]	Hawnhekk, *[isem tal-manifattur]*, jiddikjara li dan *[il-mudel tal-prodott]* jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
hu Magyar [Hungarian]	Alulírott, *[gyártó neve]* nyilatkozom, hogy a *[... típus]*megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
pl Polski [Polish]	Niniejszym *[nazwa producenta]* oświadcza, że *[nazwa wyrobu]* jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
pt Português [Portuguese]	*[Nome do fabricante]* declara que este *[tipo de equipamento]* está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
sl Slovensko [Slovenian]	*[Ime proizvajalca]* izjavlja, da je ta *[tip opreme]* v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]	*[Meno výrobcu]* týmto vyhlasuje, že *[typ zariadenia]*spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
fi Suomi [Finnish]	*[Valmistaja = manufacturer]* vakuuttaa täten että *[type of equipment = laitteen tyyppimerkintä]* tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
sv Svenska [Swedish]	Härmed intygar *[företag]* att denna *[utrustningstyp]* står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

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PEPWAVE

Broadband Possibilities

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Support
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Business Development and Partnerships
http://www.pepwave.com/partners/channel-partner-program/

Address:

United States Office
800 West El Camino Real,
Mountain View
CA 94040
United States
Tel: +1 (650) 450 9669
Fax: +1 (866) 625 4664

Hong Kong Office
A5, 5/F, HK Spinners
Industrial Building, Phase 6,
481 Castle Peak Road,
Cheung Sha Wan,
Hong Kong
Tel: +852 2990 7600
Fax: +852 3007 0588